

American Aviation

MANAGEMENT
ENGINEERING
PRODUCTION
OPERATIONS
MAINTENANCE
EQUIPMENT

MAR. 16



19

53

E. Allan Williford
President

Link Aviation 27

The CAB Isn't
Dead Yet



Will Wilson Scuttle
Second Sources? . . . 17



Policy Switch Starts
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Look for a switch in aircraft manufacturers' method of doing business with Mutual Security Agency. They're fed up with training Europeans to build U. S. plane parts in European factories, thus dumping both know-how and profits abroad.

Possibility: Establishment of foreign subsidiaries of U. S. plants, which would sub-contract the work.

•

Big increase in consumption of aviation gas by civil planes will take place over next several years—despite the coming of jets—and prices are slated to rise too.

The 1952 civil consumption was 21.4 million barrels. By 1955, it will be up 30% to 28.2 million; by 1962 a 60% increase will put the total at 34.5 million. And military demands will continue upward for several years before leveling off.

Only decrease will be in grades below 100 octane—mostly lightplanes. Consumption was 3.8 million barrels in 1952, is estimated at 3.1 million and 3 million in 1955 and 1962, respectively.

Some oil companies hiked auto gas one-half cent a gallon wholesale following lifting of price controls. Avgas increase usually follows. One supplier, for example, is considering a boost of 44c a barrel wholesale—more than 1c a gallon.

•

With 44 state legislatures in session this year, aviation representation is spread pretty thin. Legislative proposals affecting aviation are numerous—most serious is taxation in general, gas taxes in particular. Aviation interests are busy trying to cover the field.

•

Next move in higher competitive race between larger airlines may be rumored switch of one carrier to exclusively four-engine operations. This would permit extension of coach service to large number of intermediate cities without the airline competing against its own twin-engine equipment. Standardization of fleet would also pay off.

If economy-minded Congress should decide to cut back local service lines and turn some stops over to trunklines, a four-engine carrier would be spared taking on uneconomic cities—small airports wouldn't take the larger planes.

•

There's stepped-up activity in development of airborne radar for use in avoiding bad weather. Industry pressure for increased use of ground radar for terminal traffic control can also be expected.

Tremendous effect of such control is evident at Chicago's Midway Airport. Last December (no radar) delays totaled 283 hours 58 minutes on 4,185 instrument approaches. In January (with radar) delays were almost eliminated—8 hours 42 minutes on 4,333 approaches.

In the field of airborne radar, United Air Lines has contracted with RCA for an improved unit, will start three months' of tests in June in a DC-3. The Navy is finally giving serious consideration to Braniff's request for loan of an RCA set. One manufacturer has set aside \$225,000 to build any kind of airborne equipment the airlines say they want.

•

Airlines face uphill fight in selling idea that federal gas tax is a user charge. Government agencies and Congress will be reluctant to accept, because the tax wouldn't mean additional revenue—it's already being paid.

Commerce Department will have a policy statement on user charges ready soon (detailed study won't be finished until later). Interested parties have been promised a chance to comment before it's released.

The Washington View

Aro Fight Heads For Showdown

Trouble now brewing between the Air Force and Congress is apt to bring Sen. W. Stuart Symington (D., Mo.) out of the shadows of Capitol Hill and into the limelight. Since his election last fall Symington, former Secretary of the Air Force, has bent over backward to maintain his silent role as junior senator. Now he may be forced into a position where he will have to stand up and be counted.

He'll be in good company: with him will be present Secretary of the Air Force, Harold E. Talbott. The issue is that of Aro., Inc., holder of an Air Force operating contract for the Arnold Engineering Development Center at Tullahoma, Tenn., for which funds have been cut off by Congress after March 31. The antagonist is Sen. Albert Gore (D., Tenn.)

Gore is determined to bust the Aro/AEDC situation wide open. Pressures already built up were great enough to cancel the Aro contract by legislation. More recently Talbott dashed off on a hurried trip to Tullahoma to look over the situation at first hand. This is his first major problem with the Congress since he took office.

High-Level Action

The Air Force is understandably concerned about the crisis it has fostered. To date, however, there has been no word of any solution to the problem. Regular channels reportedly are being by-passed, with the entire matter treated on the highest levels. Gore has even pulled Defense Secretary Charles E. Wilson into the act, demanding action "fully recognizing the intent of Congress."

In less than two weeks the entire operation of AEDC comes to an abrupt halt unless a workable solution can be found without changing the law. Crux of the matter is the Air Force's cost-plus-fixed-fee contract with Aro. Congress banned payments to Aro after March, 1953, when, after a probe last year of the contract and performance under it, an amendment was adopted prohibiting an extension.

Aro was first awarded a contract by the Air Force in April, 1950. Symington was then Air Force Secretary and had overridden recommendations that AEDC be handled on a military or civil service basis. A subsidiary of the St. Louis engineering firm of Sverdrup & Parcel, Aro was not incorporated until a week before receiving the contract award. It was charged that the company was organized solely to secure the AEDC contract.

Gore Leads

It was Gore who led the Congressional opposition to the Aro contract and it was Gore, who, as a member of the House, was responsible for the ultimate directive from Congress. He has not let up in his insistence that Aro and AEDC be divorced. Most recently he undertook to locate a qualified replacement for Aro as managing operator. This was a difficult task, since the major purposes of AEDC are the evaluation and development testing of advanced models of military aircraft, missiles, and engines. However, he found two right within the government.

He first wrote to the Navy Department's Chief of Naval Research, and then to the National Advisory Committee for Aeronautics. Both replied that they felt they could operate the project. Amusement over its sister service's misfortune must have prevailed at Navy as John F. Floberg, assistant secretary for air, chose to respond. Floberg wrote the senator that it seemed more appropriate that the reply be handled from the Secretary's level. He said that the Navy has the capabilities for such an operation as AEDC. However, he said, if a change of administration of the project is necessary, he thought the assignment should be given to NACA.

The Tennessee senator also wrote to Defense Secretary Wilson. He asked Wilson to give the Aro matter his personal attention, "inasmuch as the Air Force has been dilatory in not arriving at a different method of operation at this late date." He also told the Secretary: "When the Congress acted on this matter last year, it was the legislative intent to give the Air Force ample time to develop a different and more satisfactory method for operation of AEDC. Instead of undertaking to follow the law, the Air Force has heretofore appeared intent upon trying to pressure Congress into changing the law. Though I am unwilling to acknowledge that our great U. S. Air Force lacks the capabilities of operating this technical facility, its disinclination thus far to undertake its operation must be recognized."

Gore concedes that the Air Force project is a vital one. There is no controversy regarding the essential nature of the project, which, when completed, will be one of the world's largest collection of wind tunnels. Gore's criticisms, which Congress has supported, are directed at the manner and methods of operation.

... Preble Staver



TIME WAS when warplanes were "flaming coffins," when a bullet in the fuel tank brought destruction—which accounted for 75 per cent of all aircraft downed in World War I.

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William D. Perreault



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Official Airline Guide: Monthly publication of airline schedules and fares. \$11 per year in USA and countries belonging to Pan American Postal Union, including Spain and the Philippines. \$12.50 elsewhere. Published from 139 N. Clark St., Chicago 2, Ill. Central 6-5804. Managing Editor: Robert Parrish.

American Aviation Traffic News (Incorporating Air Tariff Reports): Daily rates and tariff news. \$150 per year. Managing Editor: Wallace I. Longstreth.

When & Where

- Mar. 17-20—ATA Chief Pilots Meeting, Chicago.
- Mar. 23-27—Congress of Aviation Organizations, Municipal Auditorium, Kansas City, Mo. (includes Airport Operators Council and AAAE, Mar. 23-26).
- Mar. 23-27—8th Western Metal Exposition, Pan-Pacific Auditorium, and Western Metal Congress, Statler Hotel, Los Angeles.
- Mar. 24-27—Cargo Advisory Board and Traffic-Air Express Committee of Air Traffic Conference, Shoreham Hotel, Washington, D. C.
- Mar. 25-27—SAE Production Forum, Statler Hotel, Cleveland, Ohio.
- Mar. 26—ATA Public Affairs Committee, Annual Meeting, Kansas City, Mo.
- Mar. 27—National Association of State Aviation Officials, Board of Directors Meeting, Kansas City.
- Mar. 31-Apr. 2—1st International Magnesium Exposition, National Guard Armory, Washington, D. C.
- Apr. 18-19—Air Force Association, California Wing Convention, Hotel Manor, San Diego, Calif.
- Apr. 20-24—SAE, Aeronautic & Aircraft Engineering Display, & Aircraft Production Forum, Hotel Governor Clinton, New York.
- Apr. 28-30—Air Traffic Conference, Edgewater Beach Hotel, Chicago.
- Apr. 29-May 1—AIEE-IRE Electronics Components—Symposium, Shakespeare Club, Pasadena, Calif.
- May 8-10—Oklahoma City Air Fair, Will Rogers Field, Oklahoma City.
- May 11-13—IRE National Conference on Airborne Electronics, Dayton Biltmore Hotel, Dayton, Ohio.
- May 14-17—9th Annual Forum, American Helicopter Society, Mayflower Hotel, Washington, D. C.
- May 17—National Air Carnival (Armed Forces Day), Municipal Airport, Birmingham, Ala.
- May 18-22—5th National Materials Handling Exposition, Convention Hall, Philadelphia, Pa.
- May 19-22—ATA Operations Conference, Park Plaza Hotel, St. Louis, Mo.

International

- Mar. 23—IATA, Medical Committee, 3rd Meeting, Estoril, Portugal.
- Apr. 20—IATA, 6th Technical Conference, Puerto Rico.
- May 14-22—FAI Conference, Scheveningen, Holland.
- June 16—ICAO Assembly, Brighton, England.
- June 26-July 5—Int'l Aircraft Engineering Convention, Paris; and Int'l Aircraft Show, Le Bourget Airport, Paris, sponsored by French Aircraft Industries Association.

AMERICAN AVIATION



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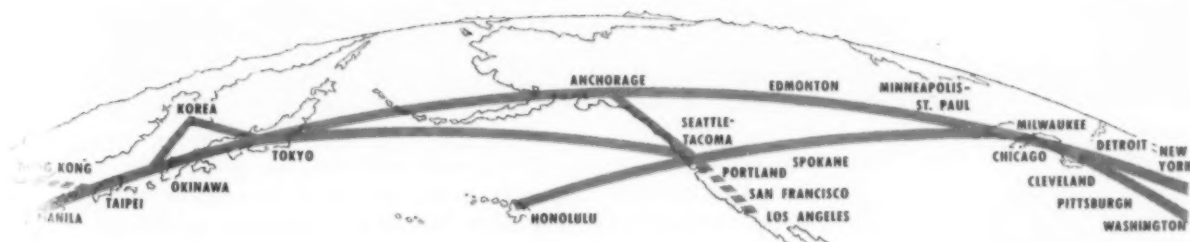
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Editorial

Not Quite Yet

THE LONG DELAY by the Eisenhower administration in filling the vacancy on the Civil Aeronautics Board, and the recent speech by Miss Carlene Roberts, vice president of American Airlines, taking the CAB apart and indicating American's view that the CAB had outlived whatever usefulness it was intended to have, have given rise to all sorts of rumors

that the CAB is about to be radically reorganized or transferred or merged into another government unit.

It goes without saying that the new Administration will consider reorganizing or transferring CAB, but there is no imminence in such a

drastic step. Meanwhile there is urgent need for a fifth member to provide the right kind of political balance. This, in itself, might well cure some of the CAB's past and present weaknesses. Any sort of reorganization by which regulation of air transport might be intermixed with regulation of other forms of transportation not only needs serious study but requires the most careful and skeptical scrutiny. CAB is not so bad that high-caliber manpower can't give it renewed vigor, strength, and stability.

Day-dreaming at Collier's

The temptation to oversell civil aviation is about as easy as reaching for "one more drink" before leaving a good party, but even the wildest prognostications of dreamy-eyed industry publicity men have been unable to reach the heights of some national magazines. Sometimes these consumer publications don't reach for just "one more drink" but decide to finish the bottle and stay all night warming up to the subject.

Take the article by Frank Tinsley in *Collier's* for February 14 entitled "Copter Commuting—You'll Be Doing It Soon." It just about set an all-time record for fanciful dreaming, assisted ably by four-color illustrations of a dozen varieties and sizes of helicopters flying every which way over New York City. According to the author, helicopters "are going to revolutionize your life, just as the automobile and the railroad transformed your father's and grandfather's lives."

The helicopter is a very versatile and useful vehicle which is making its mark in aviation history and will go far in the future. But unless some com-

pany is trying to unload a big new stock issue on an eager public, there's no use misleading the public into believing that within ten years the skies are going to be filled with big commuting helicopters which will alter the farmers' and the housewives' shopping patterns and perform every trick of transportation except replace metropolitan subways.

The article has to be read to be appreciated. Just as in 1946 when national magazines oversold private flying, *Collier's* is now overdoing it by a few million miles on behalf of the helicopter.

Mr. Tinsley used as one example of how the helicopter is *here now* the scheduled service of British European Airways between Liverpool and Cardiff. He just got under the wire on that one, since BEA is now putting its three helicopters up for sale after a financial loss which only a government-owned airline could have undertaken in the first place. Aviation is good and sound enough without wild overselling. *Collier's* ought to have learned that by this time.

Economy Suggestion

With every good reason for doing so, at the time, the Civil Aeronautics Board launched a comprehensive general airline passenger fare investigation a year ago. But events have proved that it was too big a bite to take at once.

Already a year old, the investigation will take another two or possibly three years to complete. Anywhere from 70,000 to 100,000 man-hours will be consumed and a half-million dollars in salaries paid out to government and industry participants. Meanwhile all of the basic facts upon which the inquiry was launched have already been changed and will be entirely obsolete by the time the whole business is finished. CAB would be well in line with today's economy moves to dismiss the investigation. It can do so with the same good intentions with which it launched the proceeding.

'Whose House is of Glass . . .'

The Aircraft Owners and Pilots Association has always done a good job of representing its membership, but lately it seems to have a chip on its shoulder and a tendency to twist a few facts or make up a few facts to suit itself. In a recent issue of *AOPA Pilot*, Max Karant let loose with a full-scale blast at airline pilots and cited seven mid-air collisions in which he concludes, with emphasis, that the airline pilots simply weren't looking where they were going.

It's interesting to conjecture just how Mr.



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Karant drew such a positive conclusion on one of those collisions, because the CAB hasn't yet issued its report and until it does so it would seem unwise to assess blame. In two other accidents which he cites, the CAB held that the private planes, not the airlines, were at fault. In another collision, the blame was equally assessed between private and airline pilots. Having discovered these discrepancies we didn't bother to look up the other reports.

We aren't sure that AOPA is furthering its cause of keeping wide open access to busy metropolitan airports for its membership when it swings out high, wide, and handsome against airline pilots whose full-time business is flying in public carrier transportation.

It isn't that airline pilots are never at fault, it's the bare fact that non-airline pilots have built up a sizeable record of not knowing where *they're* going that makes mudslinging in the flying fraternity a dubious undertaking. CAB has reported that there were 155 non-carrier mid-air collisions from 1946 through 1951. Of this total, 45 involved lightplanes in which the pilot or pilots of one or both airplanes failed to observe the other aircraft. A good percentage of other accidents accrued from bad landing approaches, failure to follow traffic patterns, and from just plain horseplay—all factors being of the type which lead to mid-air collisions.

As George Herbert said 'way back in 1640, "Whose house is of glass, must not throw stones at another."

Does It Make Sense?

We were not a little disturbed by the pessimistic outlook toward international airline stocks given by National Aviation Corporation in its annual appraisal of the industry recently. This sagely directed aviation investment firm noted that the gap by which international airline revenues failed to meet expenses widened in 1952.

This step in the wrong direction, the review said, undoubtedly can be attributed to the same cost trend that afflicted the domestic trunk airlines last year, "but the failure to offset that trend, in a period when new traffic records were being set, is basically disturbing, for carried with it is the implication that commercial self-sufficiency and earning power are more remote than a year ago."

This summary highlights our previous stand on this page that inauguration of low-fare service across the North Atlantic during peak traffic seasons is contrary to common sense and sound economics. It is very fine to increase the traffic volume, but to do so at the expense of increasing subsidy is foolhardy.

We have only the highest commendation for the efforts of Pan American Airways, which led the low-fare drive on the Atlantic, to popularize air travel, but to do this by widening the gap between revenues and expenses, thus putting the burden on mail pay, is contrary to every sound business consideration. Especially when last summer's traffic would have been capacity at higher fares.

MARCH 16, 1953

How Was That Again?

Whenever the British find themselves lacking in a first of some kind they make up the deficiency by producing a movie. And when it comes to producing good movies the British can rightfully claim supremacy over Hollywood hands down. But sometimes in their eagerness to keep up the morale of that tight little island they have a way of dispensing with facts. Very gracefully, mind you, but with a completeness that is sometimes astonishing as well as awe-inspiring nonetheless.

We finally got around to seeing "Breaking the Sound Barrier" which, as movies go, is very excellent. But in their enthusiasm the producers got so mixed up with the facts that every viewer of the movie could but conclude that it was the British, not the Americans, who first achieved supersonic flight. At one point in the film there was a tense moment when somebody mentioned that the Americans were also at work on the sound barrier, but that was the last of it. Otherwise the British came out absolutely supreme, complete with tears, personal tragedies, frumpled chief engineer, and all that. Now mind you, the film didn't come out and say that the British were first—it just left a very neat impression with the viewers. Nice work if you can get it.

National Aircraft Show

We are pleased that the National Air Foundation, which has operated the National Air Races for so many years, is going to repeat that annual event again this year, September 5-6-7. The name has been changed to National Aircraft Show, and racing events are being discontinued. The locale, which has varied from Cleveland to Los Angeles and Detroit, is to be Dayton, Ohio, this year. It should be a notable success.

The evolution of the national event from racing to a national display is natural and inevitable and perhaps NAF will develop an American version of the British Farnborough. Army, Air Force, Navy, and Marines will participate this year (with NAF paying per diem for all personnel and all fuel costs) and the Aircraft Industries Association has sanctioned the show for industry exhibits. There will be a repeat of several traditional events and probably a civilian aircraft performance demonstration. Perhaps most important, the Dayton show will celebrate both the 50th anniversary of powered flight and the Ohio Sesquicentennial.

Meantime at Detroit the Aero Club of Michigan will hold its sixth annual Aviation Exposition July 9-12, which takes the place of the combined exposition and National Air Races of last Labor Day weekend. This type of show should do much to stimulate aviation interest in that important area.

Wherizzit?

Whatever happened to the big 50th anniversary celebration of powered flight? Anybody seen it lately?

... WAYNE W. PARRISH

Letters

THE CORPORATE FIELD

To the Editor:

I have heard a great deal of favorable comment regarding the article "Getting the Most From the Corporate Fleet" and similar ones tending to emphasize corporate flying. Pilots and dealers alike feel that such publicity will help that particular field of aviation tremendously.

I want to mention before closing that I thought your article was very accurate as regards the facts brought out from our interview.

J. V. SWANSON

Chief Pilot
Sears, Roebuck and Co.
Chicago, Ill.

PROFESSIONAL INSTRUCTORS

To the Editor:

I am an equipment instructor for Pan American Airways and read with interest the article by Mr. Murphy "Just How Good is Airline Safety Training" in which along with other subjects the use of professional instructors is discussed.

Pan American has utilized professional instructors for equipment training for some time. The training sections of Pan Am however are made up of two types of instructor check pilots, each with different duties and responsibilities.

- **Equipment instructor** and check pilot (professional instructor)

- **Route check pilot** (line pilot)

The equipment instructor instructs or checks the actual flying ability of regular line pilots during flight sessions in which the airplane type normally flown by the line pilot is very thoroughly "wrung out" during all phases of normal and emergency operation. Great emphasis is put on proper handling of critical performance maneuvers and the operation of the aircraft under all kinds of emergency conditions.

The route check pilot checks and instructs the line pilot during actual operation of the aircraft on the line. Emphasis is also put on flying techniques but under more normal conditions. Stress is placed more on adherence to line operating procedures, loading, flight planning, pressure pattern, navigation, cruise control, passenger relations, etc.

The equipment instructor strives to improve actual flying techniques while the route check pilot works more with procedures involved in getting the airplane from A to B. There is of course close coordination between the two groups closely supervised by the chief pilot-training.

The duties of the equipment instructor require that he daily run through no-flap landings, two-engine landings, control-boost-off landings, hydraulic failure landings, emergency flap and gear extension landings, two-engine landings without hydraulic power, ice-up windshield landings, landings with airspeed out, VI engine failures and

climbouts, two-engine climbouts, engine failures and refused takeoffs, feathering and unfeathering, engine fires, heater fires, cargo fires, emergency descents, etc. He makes 1,200 to 1,400 of the above landings a year, and training continues day or night, including hundreds of instrument let-downs to very low altitudes, flying with different pilots every day, experienced and otherwise.

The equipment instructor is limited by Pan Am to two types of equipment so he will be sure to know his airplane cold, such as CV-240 and DC-6B, or Boeing 377 and Constellation, or DC-6B and Constellation.

The comment of F. A. Stone of Eastern Air Lines that "Crews taking instruction respect experience" is probably correct. I am confident that crews receiving equipment training or checks must respect the experience of the equipment instructor who has been doing this work for a long time and probably has 7,000 to 8,000 hours of training experience to draw on. Likewise when receiving their route checks I am just as sure they also respect the experience of the route check pilot.

Stone goes on to state, "You must sell training if it is to be accepted. You can't sell it by professional instructors, he is more interested in his job and department." I don't believe anyone is more sold on training, or is a better salesman for training, than a man who has made this his life's work. I am sure that he will be a better salesman than, for instance, the line pilot who only accepts assignment to training activities because of the bonus most operators have to pay to get a line pilot to do this hazardous and tedious work.

Pan American strangely enough desires that all personnel be "interested in their job and department."

We are every bit as concerned with our airline's safety record as anyone flying the line, or connected with it in any way, and feel that our contribution to this record has not been a small one. The training sections of Pan Am incidentally have an excellent safety record all their own.

Since the adoption of present training methods, training times have been cut enormously, mostly because of the efficiency which results from a standardized program and a well controlled and standardized group of instructors.

I hope to see more such articles.

HOLLAND L. REDFIELD
Setauket, L. I.

BUREAUCRATS' FATE

To the Editor:

Your article in a recent issue of AMERICAN AVIATION on our technical assistance program was read here with much interest, as you may imagine.

I would like to thank you for the sympathetic approach which you have taken to the work we are doing. Each of the missions that we have abroad would provide an interesting story in itself, and some day I hope that we will be able to record the quite extraordi-

nary achievements some of these men have made.

There is one point which I ought to mention, that is that the \$1,500,000 to which you refer was the estimate which we submitted to the Technical Assistance Board in New York, but unfortunately our estimate was cut to \$1,054,000, an experience which is not uncommon to us bureaucrats, even at the international level. We hope, nevertheless, to stretch this money out to cover as many of our requests as possible.

Thank you very much again for your interest.

E. R. MARLIN

Director of Technical Assistance
International Civil Aviation Organization
Internatl. Aviation Building
Montreal, Canada

HELICOPTERS

To the Editor:

Mr. Littlewood's remarks concerning the inherent mechanical complexity and the resulting high initial and maintenance cost of rotary wing aircraft (AMERICAN AVIATION, January 5) strikes the heart and soul of this company.

As you may or may not know, our entire efforts during the past five years have been devoted to the development of tip-located jet-powered helicopters for the express purpose of reducing mechanical complexity and the corresponding high initial and maintenance cost. We believe that great strides have been made in this direction. As an example, the XH-26 pulse-jet helicopter is estimated to have a degree of mechanical complexity only one-fourth that of equivalent conventionally powered machines. The initial and maintenance costs are estimated to be of the same proportions. Larger cargo and passenger-carrying helicopters powered by tip-located pulse-jet engines are predicted to have even more favorable cost characteristics.

With regard to Mr. Littlewood's comments about single-engine reliability, we would like to point out that tip-located pulse-jet-powered helicopters give promise of providing "multi-multi" engine reliability. For example, on relatively large cargo-carrying helicopters where several engines are employed at each of the rotor blade tips, as many as 12 to 16 individual and separate engines may be employed.

As you may know, to date our company has been engaged primarily in development work for the military and, consequently, we are anything but authorities in the commercial transportation field. However, we did want to take the opportunity to make the above points to at least indicate that within the relatively near future Mr. Littlewood's primary objections to rotary wing aircraft may be eliminated.

CORWIN D. DENNEY

President
American Helicopter Co., Inc.
1800 Rosecrans Blvd.
Manhattan Beach, Calif.



The Sleeper Plane that "WOKE" the traveling public

American Airlines pioneered in the development of the sleeper plane for coast-to-coast service, introducing it in May 1934.

Sleeper service proved to be particularly important to the growing airline industry at that time. For it literally "woke" the public to the fact that air travel, with its

tremendous time-saving advantage, could also match every standard of comfort and luxury offered by surface transportation.

Many transportation officials were frankly dubious about the potentialities of sleeper planes, but mounting popularity and public demand soon wiped away all

doubts. Other airlines, taking their cue from American's success, began to install berths in some of their own long-haul aircraft.

The inauguration of sleeper plane service is only one of many milestones in the history of air transportation that have been introduced by American Airlines.



AMERICAN AIRLINES INC.
America's Leading Airline

FIG. 1 IN A SERIES OF ADS SHOWING THE PROGRESS OF AIR TRANSPORTATION

MARCH 16, 1953

QUESTION FOR THE COMET

To the Editor:

During the past dozen years, I have served as a bomber and transport pilot in the Air Force and as airline pilot in civilian life. My last tour of active duty ended this past summer and included an assignment with a high altitude bomb wing.

I recently read with great interest your article on the performance of the Comet and its possible effects upon our air industry. The flight in the Comet itself sounded great, but a couple of questions arose as a result.

For purposes of discussion, let us consider 25,000 feet as marginal, 35,000 feet as critical and 45,000 feet as fatal

to a person so exposed without an immediate and positive source of oxygen. We are seated in our Comet at 40,000 feet cruising altitude—cabin pressure, let us say, is 10,000 feet—when a door blows.

We are now confronted with an emergency de-compression. It is suddenly quite foggy and growing bitter cold—the sudden outpouring of breath gave us quite a jolt. We have less than 15 seconds to properly clamp an oxygen mask to our face. No assistance will be forthcoming from any of the flight crew, as they are limited to helping themselves and are now in fixed positions. It will take an unusual group of calm, well-briefed and trained passengers to

manage this seemingly simple task with any degree of safety.

The pilot will, no doubt, start an emergency descent but he too is limited, as our cruising speed has been rather close to our mach and at 40M our jets will flame out at any power below about 80%. With dive brakes, gear, and flaps we will, of course, descend rapidly even with power on, but, I fear, not fast enough to aid our several excited passengers in the rear. If our pilot elects to flame the jets out, he has an air start of cold engines with the aircraft in a very poor configuration.

The situation described above presents some very real problems, and as one who believes jets are here for the better, I would very much like to hear the answers that BOAC has to these problems. I cannot believe they would sell space to trusting passengers without them.

I would greatly appreciate hearing any information or instruction you received prior to your ride on the Comet, or, for that matter, any other comments on this epistle.

JERRY CRANCE

Great Neck, L. I.
New York

(No special instructions were given to the passengers on the Comet flight in question. Comet crews are equipped for such a possibility. One crew member is always using an oxygen mask of the demand type, the others have the masks attached to their helmets but not over their faces. The oxygen is "on" and breathing in the mask draws oxygen. In the event of explosive decompression the protected pilot applies air brakes, cuts throttles back, and descends at 250 knots and 7,000 feet per minute to 8,000 feet altitude. It is assumed that the passengers would lose consciousness. After the emergency descent to 8,000 feet the passenger and crew difficulties would be corrected and the flight resumed at 11,000 feet altitude on two engines.—Ed.)

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SUGGESTION BOX

To the Editor:

In reading the article on prop reversing by Joseph Murphy in the February 16th issue of your fine publication, I found myself given to some ironical thought with regard to the long periods of time that are usually consumed by the aviation industry in eliminating serious hazards to safety.

It is almost five years ago that some of our first reversing troubles began. At that time, in the spring of 1948, a domestic operator found one of its aircraft off the runway and through a fence as a result of a reversing failure on one or more engines. Having listened to a discussion of this accident at a plant conference, I later submitted the enclosed letter of suggestion for consideration in an attempt to approach a practical solution of the problem.

Now, while I admit that this suggestion was initiated as a result of a happening that differs with those that presently keep the issue alive, I do believe that if the amateurish suggestion had been invoked we might have avoided the sad and shameful loss of lives that was experienced at Elizabethtown. I'll warrant that those who died as a result of the lack of proper and adequate warning devices would gladly have paid for the cost of such modifications. If my memory serves me correctly, the accident board reported that had such devices been in use, the accident probably could have been averted.

It is hard, if not impossible, to say just where the blame should be placed,

AMERICAN AVIATION

but to be sure, we all are to accept a portion of it as our own. That is to say, that the manufacturers, the operators, the pilots, the administering agencies, and the general riding public are all interested parties to the matters of safety in aviation and as such they must carry their own particular portion of the burden of responsibility to help diminish and eliminate such hazards.

In this respect, I am sorry now that I did not carry the suggestion to our own ALPA safety department for review.

My ultimate thought in all of this is that we have a need, a very definite need for a facility which would afford a wide latitude in suggestion, observation, and comment on any given subject pertinent to the safety program in commercial aviation. In short, I would like to suggest to you that space be provided in your periodical for a "National Suggestion Box on Safety."

Here the opportunity would be afforded to one and all to participate freely in discussion of all topics however big or small . . .

HANK CAREY

Coral Gables, Fla.
(See page 32—Ed.)

ALASKAN AVIATION

To the Editor:

Mr. Bramley's recent series of articles on Alaska has been excellent. Judging by his accounts of things as he saw them, I think he is one of the few writers who has any comprehension and appreciation of Alaskan aviation.

I was fortunate enough to be one of the relatively small group of people who have been closely associated with the incredible advancement of Alaskan aviation since 1940. With this fact in mind, you can give any weight that you desire to my assertion that you have written an outstandingly good series of articles on and for my old friends—Alaskan aviation and its people who made it what it is today—a way of life.

NAME WITHHELD

FOREIGN POLICY

To The Editor:

I want to thank you for your very kind words about Seaboard & Western in your fine editorial "A Place to Expand" and to compliment you for stating so frankly the rewards that could come to the United States with a more enlightened viewpoint guiding our foreign air policy.

It is particularly gratifying to find in a publication (other than one of our many briefs to the Board) an awareness of the dynamic character of international trade, with particular reference to international air freight. I sincerely hope that in the ensuing years some of these thoughts can be effectively conveyed to our Civil Aeronautics Board, so that the result will be a more realistic foreign air policy.

RAYMOND A. NORDEN

President
Seaboard & Western Airlines
60 Broad St.
New York 4, N. Y.

TERMINAL TALK

To the Editor:

I was very pleased with your article on public announcements at airports in the March 2 issue of AMERICAN AVIATION, the reason being that this article expressed my feelings 100%.

We think that we have overcome this objectionable feature that exists in most airports throughout the country with the installation and operation of our sound system in the Greater Fort Worth International Airport. All announcements will be made by the same soft voiced girl from a central control room, and when announcements

are not being made, soft background music will be playing. The sound system in this terminal building has been described as one of the finest in the country, and we have 499 speakers in the building so that a personal message will be received rather than a blaring political speech by some out of breath ramp agent.

Thanks very much for your article, and we hope you can write a different kind of article on our system when you see it in operation on April 26.

M. H. HUFFMAN

Executive Director
Fort Worth Air Terminal, Inc.
Fort Worth, Texas



Unlike the proverbial horseshoe nail that lost the battle, today's military aircraft win battles because of the quality of their components.

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☐ Aircraft
Electrician

☐ Sheet Metal
Mechanic

☐ Inspector

☐ Sheet Metal
Layout Man

☐ Aircraft Radio
Installer

☐ Aircraft Radio
Mechanic

Industry Spotlight

A 28,000 pound missile, destined for long range surface-to-surface operations, is now being developed at General Electric. The missile, known as the A-3 in G.E.'s Project Hermes (guided missiles), is roughly the same size as the German V-2 of World War II.

Two different arrangements will be used on the Republic F-84F's, swept-wing versions of the F-84, to provide added control effectiveness. Early models will have a pilot-controlled horizontal stabilizer setting. Later models will use a full flying tail, providing dual power sources, hydraulic and electrical, to actuate the tail.

Melpar, a division of Westinghouse Air Brake located in Alexandria, Va., has been designated by the U. S. Air Force to build the production flight simulators designed by Engineering Research Corp. in Riverdale.

Canadair's role in the production of the Bristol Britannia will be to produce a single plane, with modifications to accommodate Wright Turbo-Compound engines instead of Bristol Proteus turbo-prop engines, and to increase the mach limitation to about 400 miles per hour. Canadair's initial contract, which will probably be followed by a sizeable production order, is with the Canadian government, which is making the agreement with Bristol. Another agreement will cover possible civil production.

Last of Boeing Airplane Company's piston-engine bombers, a B-50, has rolled off the assembly line at Seattle and the company is now ready to concentrate strictly on jet bombers, the B-47 and B-52. Boeing produced 6,981 B-17's, one XB-15, 2,765 B-29's, and an undesignated number of B-50's since 1937. Douglas and Lockheed turned out an additional 5,750 B-17's and Bell and Martin 1,204 B-29's.

Although a commercial version of the General Electric J73, rated at about 10,000 pounds thrust, will not be available until 1956, G.E. is putting considerable effort into promoting it for jet transport use in competition with the Pratt & Whitney J57 and Curtiss-Wright J67. G.E. expects to supply early U. S. jet transports with a packaged fuel system and reports indicate the company's reverse thrust system, for landing deceleration, may also be the first to find commercial application.

In the "thinking aloud" stage in Canada is a new concept in aircraft design said to embody the "gyro" principle. This will be a "flying-saucer" configuration. It is being worked on by Avro Canada with the support of the RCAF and government research groups.

An entirely new concept of foreign licensing of U. S. built aircraft and parts, under the MSA program, is due to be consummated soon. It will eliminate the present industry objections to spilling U. S. private industry's "know how" to foreign competitors without so much as reasonable remuneration.

Contract negotiations between Fairchild Aircraft Division and Boeing Airplane Company, under which Fairchild would build wing panels for the Boeing B-52, are well along. Fairchild representatives have been in Seattle winding up the arrangements.

Industry concern over window blowouts in the Lockheed Constellation is mounting. Pan American has started changing over from Sierracin windows to plate glass at considerable expense, but rest of industry is awaiting ATA service meeting with Lockheed before acting. Lockheed fix, involving a \$92 laminated Sierracin window (about \$3,000 per plane) has not been well received.

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FAST MILITARY PLANES could fly more efficiently in banking and turning if the air gap between aileron and wing were sealed off. A coated fabric seal would work . . . but led to other problems. It took so many screws to fasten the seal tight that repair was a headache. Yet the seal had to be removable.

Here was one problem that B. F. Goodrich engineers solved with a pat, ready-made solution. Their famous Pressure-Sealing Zippers had been proved in even tougher sealing service. Overlapping rubber lips provide a

100% seal against air pressure. This is just what was needed on the aileron. And it saves time on the ground—with a zip, the mechanic can expose the aileron. If a new aileron is installed, the new and old halves of the zipper mesh perfectly. No more hours of taking out screws, putting in screws!

B. F. Goodrich Pressure-Sealing Zippers fit snugly around complex shapes. They can be cemented onto either fabric or metal. They save space and weight. They have been used on airplane doors, air ducts, inverter covers and for watertight protective coverings.

The Boeing B-47, illustrated, is just one airplane to equip ailerons and elevators with B. F. Goodrich pressure-sealing zipper seals. Others include the Convair B-36, Lockheed P2V.

Other BFG products for aviation include tires, wheels and brakes; heated rubber; De-Icers; Avtrim; Plastilock adhesives; inflatable seals; fuel cells; Rivnuts; accessories. *The B. F. Goodrich Co., Aeronautical Division, Akron, Ohio.*

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"ELECTRIC Charlie" Wilson's program . . .



. . . MAY DIE under "Engine Charlie" Wilson's regime.

Will Wilson Scuttle Second Source Program?

One third of aircraft procurement money since Korea, it is estimated, went into program which may die.

By ROBERT M. LOEBELSON

THE SECOND-SOURCE concept for aircraft and engine plants, conceived and fostered by one-time General Electric president Charles E. Wilson when he was Defense Mobilizer, may be about to be scuttled by his namesake, former General Motors boss Charles E. Wilson, in the interest of a balanced budget.

In the three fiscal years which will have elapsed since Korea by this coming June, Congress appropriated more than \$11 billion to the three services for aircraft and related procurement (\$10.2 billion in fiscal 1951, \$15.5 billion in 1952, \$14.5 billion in 1953). No one can determine for certain how much of this \$40 billion actually went to buy aircraft, engines, and parts and how much was set aside to buy machine tools and other equipment for prime and secondary aircraft production sources. But in-

formed industry sources believe one-third or more of that amount went for the latter purpose.

If that estimate is accurate, about \$15 billion went for tooling, a good part of it to get secondary sources ready to turn out aircraft and engines. Most of that \$15 billion, of course, has already been paid out. But if parts of the second source program were to be eliminated, even if the plants are partially complete, some money already appropriated would not have to be spent. And future budget requests to take care of these facilities could likewise be cut.

When "Electric Charlie" took over as head of the Office of Defense Mobilization a few months after Korea, he declared himself fully aware of the fact that existing defense plants, notably those in the aircraft industry, could attain the limited mobilization goals by going on a two- or three-shift basis. But

he pointed out that in case of all-out mobilization the existing aircraft and engine plants would not be able to handle the job alone, and that much valuable time would be lost in bringing in secondary sources of supply after a full-scale war had broken out.

Instead, said Wilson, let's get at least two sources of supply in operation now, even if it costs more, so that if we need those extra aircraft plants, we'll be ready to go. That theory was subsequently widely adopted by the Air Force (and to a lesser extent by the Army and Navy). This was the result:

- Boeing's B-47 jet bomber was also assigned to Douglas-Tulsa and Lockheed-Marietta.

- Republic's F-84F swept-wing fighter-bomber was also ordered built at a new General Motors plant in Kansas City.

- Fairchild's C-119 cargo plane was also placed in production at Kaiser-Frazer's Willow Run facility.

- McDonnell's F3H Demon carrier

jet fighter was also given to Temco to produce.

- **Pratt & Whitney's R-2800** and R-4360 reciprocating engines were licensed to Nash and Ford-Chicago, respectively.

- **P&W's J57** 10,000-pound-thrust turbojet was assigned to Ford-Chicago after the R-4360 work there phases out.

- **General Electric's J47** was also slated for production by Studebaker and Packard.

- **Westinghouse's J40**, now being produced at Philadelphia, is also scheduled to be turned out by Westinghouse-Kansas City, Ford at Wayne, Mich., and Lincoln-Mercury at Romulus, Mich.

- **Curtiss-Wright's J65** Sapphire was also delegated to Buick.

- **C-W's R-1300** is being built by Kaiser-Frazer Engine Division at Dowagias, Mich., and its R-1820 by Avco's Bridgeport-Lycoming Division at Stratford, Conn.

- **C-W's R-3350** and R-3350 Turbo-Compound are also in production at the Chevrolet plant in Tonawanda, N. Y.

Just after handing in his resignation as a result of the handling of the steel strike a year ago, the former G.E. chief submitted his Fifth Quarterly Report to the President. In that report, Wilson again discussed the second-source program, pointing out, "In a sense it will be costly, because it will add to the cost of each new type of plane or tank produced the cost of creating and maintaining the reserve capacity for production of that same plane or tank."

He added, however, "But in reality the mobilization base will cut the cost of our defense preparations—for insofar as we can maintain the ability to swing instantly into all-out production, we reduce the need to produce stocks of combat equipment which stand idle and become obsolete."

At the same time, "Electric Charlie" warned that, "Where it can be avoided, no plant that is a part of the [mobilization] base should be closed—because too much time would be lost if the production organization had to be formed anew when all-out mobilization began."

It is beginning to appear, however, that "Engine Charlie" Wilson, the new Secretary of Defense, may choose to ignore the warning. There are persistent reports that many second sources in the aircraft industry are to be closed down so that several hundred million dollars authorized by Congress to tool and otherwise equip these facilities will not have to be spent. Such a move, of course, would serve to cut down on expenditures authorized or planned for "aircraft and related procurement" during the current fiscal year, as well as in fiscal 1954, 1955, and possibly even 1956. At the same time, it is a gamble which may cause disaster.

What are the plants which might be eliminated if the Defense Secretary's reported thinking is carried out?

In the engine field:

- **Wright R-1300**, used in the North American T-28 and other craft, is already in production by Kaiser-Frazer and Wright has discontinued output. Probability: K-F stays in.

- **Wright R-1820**, used in the Grumman S2F and Piasecki H-21, already phased out by Wright. Probability: Bridgeport-Lycoming stays in.

- **P&W R-2800**, used in the Bell HSL helicopter, Chase C-123, Douglas C-118, Convair T-29, VT-29, and C-131 and commercial Douglas DC-6, and Convair 340. Vitrally needed by both military and commercial users. Probability: Nash stays in.

- **Wright R-3350-26** and **R-3350-30**, used in Martin P5M, Fairchild C-119, Douglas AD Skyraider series, Lockheed C-121, P2V, R7V-1, and WV-2. Chevrolet has begun output of the dash 26 and is ready to start on the dash 30 turbo-compound. C-W, however, is still building the engines itself. Probability: Chevrolet out or reduced.

- **P&W R-4360**, used in the Convair B-36, Boeing C-97, and Douglas C-124. Ford is already phasing out the Turbo-Wasp in favor of the J57. Probability: Ford out on R-4360.

- **Westinghouse J40**, used in McDonnell F3H, Douglas A3D, Grumman F10F, and other aircraft. Highly vital but deliveries slow so far. Probability: Westinghouse-Kansas City in; Ford and Lincoln-Mercury, neither near production, out.

- **General Electric J47**, used in North American F-86 and FJ-2, Boeing B-47, and Convair B-36. Engine considered vital and Studebaker is already turning them out in quantity. Probability: Studebaker in; Packard, just starting production, out.

- **P&W J57**, used in the Boeing B-52, North American F-100, and other high-priority aircraft, is still in limited production by P&W while Ford-Chicago has barely begun tooling. Probability: Ford out.

- **C-W J65**, used in the Martin B-57, Republic F-84F, and North American FJ-3, is still not being produced in the quantities the USAF and Navy would like but production at Wood-Ridge is being stepped up. Probability: Buick out.

In the airframe field:

- **Boeing B-47**—If two sources are decided on, Lockheed-Marietta, where the C-130 is to be built, will probably be eliminated. Both Marietta and Douglas-Tulsa have just begun Stratojet output, but no other plane has been assigned Tulsa.

- **Republic F-84F**—Indications are that the Farmingdale concern can take care of Thunderstreak needs. General

Motors' Kansas City facility, not yet in production, will probably be eliminated.

- **Fairchild C-119**—While the Hagerstown firm could handle all required Flying Boxcar output, Willow Run, scheduled to build 159, is well along on the program. Some of the 159 nevertheless may be assigned to Fairchild, letting Kaiser-Frazer speed up on the C-123.

- **McDonnell F3H**—Since one of the primary reasons for giving Temco rights to build the Demon was because McDonnell did not have the space to build it, the F3H, and the USAF F-101, Temco may retain the contract.

While all of the above makes it appear that second sources, notably automobile companies, will sustain most of the cuts and the aircraft industry itself will get away virtually untouched, that is only partly true.

There also are intimations from the Pentagon that many projects considered of primary importance by airframe and engine companies, e.g., lengthened runways for jet operations at USAF expense, will also be reduced.

The next few weeks should tell the story. If the Eisenhower Administration wants a balanced budget and reduced defense expenditures badly enough to take a chance on being caught short in case of full mobilization, reduction or elimination of secondary sources is one quick way to do it. If, after thinking the possible ramifications over, the Defense Department's new top men decide to leave the aircraft program alone, it seems inevitable that there will be no balanced budget in fiscal 1954. . . .

MATS Operation Survey Suggestions Studied

Recommendations made by the MATS Transport Operations Planning Committee, made up of airline executives called to temporary active duty to survey the operations of the Military Air Transport Service, are now being reviewed by MATS commander Joseph Smith and his subordinates. The committee, headed by Brig. Gen. Henry C. Kristofferson of Pan American World Airways, suggested that MATS:

- **Realign** some route assignments and aircraft scheduling in each of its three operating divisions.

- **Bring about closer physical location** of transport control centers, meteorological sections, and flight-following centers.

- **Clarify** certain items in its manual to forestall possible misinterpretation by crew members.

- **Organize** its operations, traffic, and maintenance elements in a uniform manner.

Super Connie Backlog Rises to \$400 Million

Lockheed Aircraft, which now has more transports in production or on order than ever before in its history, has a backlog of \$400 million for military and commercial versions of its L-1049 Super Constellation series. This represents about 20% of its \$2 million overall backlog.

Robert E. Gross, president, says the four different Super Connie types will bring total production of the Constellation series to more than 460. Super Constellations scheduled for production in the next three years "nearly equal the total number of Connies built in the last 10 years," he adds.

Thirteen carriers are now awaiting delivery of 68 of the Super Constellations powered by Wright Turbo-Compound engines.

Vos of Fokker Dies

P. J. C. Vos, head of Fokker Aircraft Co. and one of the most dynamic men in the European aircraft industry, died suddenly on February 23, aged 49.

Vos escaped from Holland in 1941 in a Fokker G.I fighter and served with the Royal Air Force in England. He was also associated with KLM Royal Dutch Airlines. Vos was one of the founders of the International Association of Aircraft Constructors and was a fervent advocate of international co-operation. He was one of those responsible for the agreement between Fokker and Fairchild Engine and Airplane Corp. which was signed last year.

Douglas Backlog Goes Over \$2 Billion

Douglas Aircraft Co.'s backlog on December 31, 1952, stood at \$2,055,000,000, probably the highest in the aircraft industry. The company's annual report for 1952 shows a net to November 30 of \$10,792,285, or \$8.99 a share, on sales of \$522,619,409, as against a net of \$6,912,829, or \$5.76 a share, on sales of \$225,173,226 for fiscal 1951. About 13% of last year's sales represented commercial business.

The 59 DC-6B's delivered last year brought overall DC-6 type sales to 433, including 174 DC-6's, 27 DC-6A's, 174 DC-6B's, and 58 DC-7's, which are still to be delivered.

President Donald W. Douglas said the company has spent \$1 million on data and preliminary design of its DC-8



Douglas Discloses USAF B-66 Order

Confirmation of a large order for a straight bomber version of the Navy's A3D carrier-based attack bomber, the B-66, has been made by the Air Force following disclosure in Douglas Aircraft Co.'s annual report that it was preparing for production on "a large scale basis" of the swept-wing bomber for the USAF. Previously it had been announced that a reconnaissance version of the A3D, the RB-66, was to be built.

While the Navy and Air Force versions of the twin-jet plane will resemble each other, there will be several differences. The Navy plane will be fitted with folding wings and two Westinghouse J40 engines, while the USAF light bomber's wings will not fold and its power plants will be Allison J71's, rated at about 10,000 pounds thrust each.

jet transport so far, and added he felt the expenditure amply justified by progress to date.

The firm's expansion into the missile field was pointed up by a 60% increase in guided missile business over 1951. Quantity production of two models has begun, Douglas said, and 15 projects involving research, development, and production of missiles and related accessories and equipment.

CPA Victim of First Fatal Comet Crash

The first fatal accident involving a de Havilland Comet jet transport occurred at Karachi airport in the early hours of March 2 when Canadian Pacific Air Lines' first Comet IA crashed and burned while attempting a take-off.

The accident took the lives of the 11 occupants of the plane—the CPA crew of five, five de Havilland technicians, and a technician from Smiths Aircraft Instruments Ltd. The crew was headed by C. H. Pentland, director of overseas flight operations, and included C. N. Sawle, chief pilot-overseas lines, and P. D. Roy, chief navigator. They were ferrying the Comet from London to Sydney, Australia, where it was to

have been based for the operation of CPA's Sydney-Honolulu jetliner service (AMERICAN AVIATION, January 5, 1953).

The crew was to have returned to London to collect CPA's second Comet and then start an intensive crew training and familiarization flight program. Unlike other prospective Comet operators, CPA had elected to train its own crews rather than to send them to BOAC and de Havilland for training; the deceased men were the only CPA crew members with Comet experience.

The opening of the CPA Comet service across the Pacific has now been postponed indefinitely. The company's second Comet IA is ready for delivery but CPA has ordered no additional aircraft of this series, although it is reported to have placed orders for a number of the II and III series. Tentative arrangements had been made for the two IA's to be handed over to National Airlines on delivery of the later models.

This deal was subject to certification of the Comet by the Civil Aeronautics Administration, a matter which is likely to be affected by the Karachi accident. It is probable that no certification of the Comet will result until the findings of the investigators have been studied closely and the take-off characteristics of the plane have been re-examined by CAA technicians.

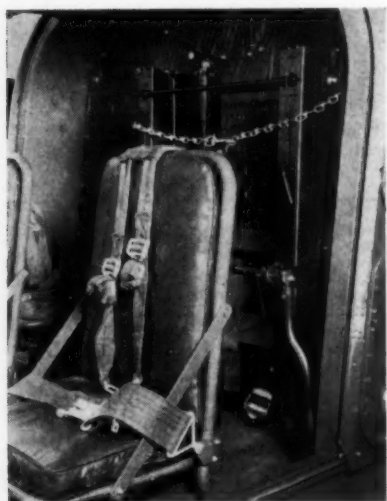


KAMAN HTK-1 three-place helicopter

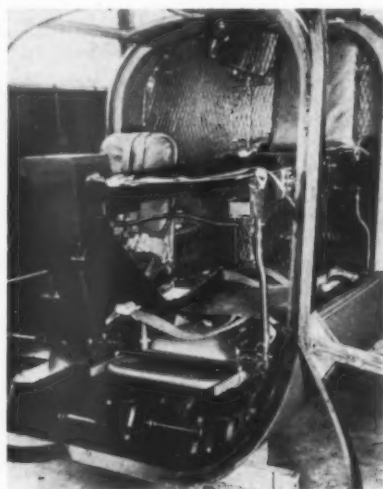
Ambulance Role For Army's HTK-1

MEDICAL EVACUATION of two litter patients at a time will be among the possible uses for the Kaman HTK-1 helicopter, as a result of the development work shown below. Using a mock-up, Kaman discovered that it could carry two litters inside the cockpit by enlarging the

nose bubble only slightly. Switch from three-place version to evacuation version can be made without tools in 2½ minutes; loading of patients takes less than two minutes. Performance is reported to be satisfactory throughout the entire weight range without the use of ballast.



1. MOCK-UP OF HTK-1 three-passenger model shows litter racks folded up against firewall behind left front seat.



2. FRONT SEAT FOLDS over rudder pedals, which have been quick-disconnected and dropped forward. Left-hand cyclic and collective sticks have been removed, stowed in rear of cabin. Litter racks are in place.



3. AFTER LANDING, left side of nose bubble is opened and upper litter rack swings downward and forward for loading.



4. LOWER LITTER PATIENT is taken aboard after top rack is swung back into position. Medical attendant rides in jump seat.

Route Applications Coming Up

New York-Chicago Case

| Carrier | Proposal |
|------------------|--|
| Braniff | Extend Route 9 from Chicago to New York. |
| Capital | New segment between Detroit and New York via Buffalo. |
| TWA | Operate Chicago-New York via Detroit and Cleveland, also via Detroit, Buffalo, and Syracuse. |
| American | Add Cleveland and Erie on Route 7; fly Chicago-Cleveland non-stop. |
| Colonial | Extend from New York to Chicago via Scranton, Binghamton, Syracuse, Rochester, Buffalo, Erie, Cleveland, and Detroit. |
| Northwest | Add Buffalo between Detroit and New York; add Chicago between Detroit and Milwaukee; add Cleveland between Detroit and New York. |
| United | Add Buffalo, Rochester, and Syracuse on Route 1; add Pittsburgh between Youngstown and Bradford; remove restrictions on service Detroit and Ft. Wayne. |
| C&S | Extend from Chicago to Detroit, and from Chicago to New York/Newark. |
| Eastern | New segment between Chicago and New York via Detroit, Cleveland, Akron, and Pittsburgh. |
| National | Extend Rt. 31 from New York to Chicago via Buffalo, Cleveland and Detroit, and via Pittsburgh, Cleveland and Detroit. |

Denver Service Case

| | |
|-----------------|---|
| TWA | Include Denver on transcontinental Route 2. |
| Western | New routes Denver to San Diego via Phoenix; and Denver to Oakland/San Francisco via Salt Lake City. |
| American | (1) Chicago to Denver and Oakland/San Francisco; Chicago to Denver and Los Angeles. (2) Chicago to Kansas City, Denver and Oakland/San Francisco and non-stop Denver-Los Angeles. (3) Chicago to Kansas City, Denver, Phoenix, and Los Angeles. |
| Braniff | Extend present routes from Kansas City to Denver and beyond (a) to Salt Lake City and Oakland/San Francisco and (b) to Los Angeles and San Diego. |
| United | (1) Include Twin Cities on transcontinental Route 1. (2) New routes from Denver (a) to Oklahoma |

City, Tulsa, Memphis, Nashville, Knoxville, Washington, Baltimore, Philadelphia, and New York; and (b) to Oklahoma City, Tulsa, St. Louis, Chicago, Indianapolis, Cincinnati, Washington, Baltimore, Philadelphia, and New York.

(3) New route from Oakland via San Francisco, Los Angeles, San Diego, Phoenix to Ft. Worth/Dallas and beyond (a) to Memphis, Nashville, Knoxville, Washington, Baltimore, Philadelphia, and New York, and (b) to Oklahoma City, Tulsa, St. Louis, Chicago, South Bend, Ft. Wayne, to Toledo and beyond (i) to Detroit, Cleveland, Akron, Youngstown, Bradford, Allentown, Philadelphia, and New York, (ii) to Detroit, Cleveland, Hartford, Springfield, Providence, and Boston, and (iii) to Washington and Baltimore.

(4) New route from Denver to Kansas City, St. Louis and beyond (a) to Indianapolis, Cincinnati, Dayton, Columbus, Pittsburgh, Philadelphia, and New York, and (b) to Chicago, Dayton, Columbus, Pittsburgh, Philadelphia, and New York.

| | |
|--------------------|---|
| Eastern | New direct route between St. Louis and Kansas City. |
| Continental | Extend from Denver east to St. Louis and west (a) to San Francisco/Oakland via Salt Lake City, and (b) to Los Angeles via Phoenix. |
| Frontier | Eliminate certificate conditions requiring certain stops on flights between Albuquerque and Phoenix and between Denver and Phoenix. |

Southwest-Northeast Service Case

| | |
|-----------------|--|
| TWA | Include Tulsa and Oklahoma City on transcontinental route. |
| Braniff | Extend Route 9 from Tulsa to Pittsburgh, Washington, and New York. |
| C&S | Extend Houston-Memphis segment to New York. |
| Delta | Extend from Columbia, S. C., to Washington and New York. |
| National | Consolidate its north-south and Gulf routes. |
| Capital | New direct route Memphis to New York. |

(Note: Applications in the Southwest-Northeast Case are those on file for some time which may be considered in the case. Numerous new applications were scheduled to be filed for consolidation prior to a prehearing conference scheduled for March 17.)

Policy Switch Brings Rush for Routes

By WILLIAM V. HENZEY

A TWO-YEAR-OLD CAB policy favoring interchange operations to the exclusion of airline route expansion has reached its first major test and appears ready to be discarded or sharply modified. In the light of this potential change, the biggest "route rush" in years is on as practically every domestic trunkline has either revived old applications, submitted new ones, or combined both for CAB consideration.

Typical of the proposals which CAB will weigh (see box above for complete list), are:

- A TWA proposal for inclusion of Denver on its transcontinental route

with direct Denver-West Coast service proposed.

- A similar American Airlines application involving Denver-San Francisco and Denver-Los Angeles routes.

- A broad United Air Lines application generally paralleling transcontinental routes of American and TWA.

- Proposals of Braniff, C&S, and Delta to extend their systems from the southwest into New York.

- A Colonial Airlines application for a new route between New York and Chicago.

- Capital Airlines' requests for a new Chicago-New York route and a Memphis-New York direct route.

Practically all of the applications for new routes have been proposed for hearing in one of these major route proceedings, just put under way by CAB:

- New York-Chicago Case in which CAB will take a look at airline proposals for new competitive services between the nation's two largest cities.

- The Denver Service Case, generally considered to test proposals for improving east-west service for Denver, but potentially a proceeding involving a major re-alignment of transcontinental routes.

- The Southwest-Northeast Service Case stemming from a TWA proposal to add Oklahoma City and Tulsa to

its transcontinental route, but replete with new competitive possibilities, particularly for American Airlines.

Senior dockets in these three cases go back to 1946 or before. Ordinarily they might have been reached on CAB's calendar earlier, but the "clamped-lid" policy, heralded by a January, 1951, CAB decision in the Southern Service to the West Case, contributed to postponement until now.

Chiefly responsible for the CAB switch at this time is the internal ruckus among CAB members (AMERICAN AVIATION, February 16) in which two members, Josh Lee and Joseph P. Adams, feel, in effect, that the industry can't stand pat indefinitely on the current route structure.

Reportedly the New York-Chicago and Denver Cases, though they are major in scope, served as stepping stones in the internal CAB fight for opening the Southwest-Northeast Case, which is the one Member Lee is said to feel will result in more competition for American Airlines.

However, the decision now is simply to try the applications, not decide them, so that predictions for a period of all-out route expansion would be premature.

"Close Scrutiny"

CAB Chairman Oswald Ryan, in a pre-Christmas speech in Dallas, indicated that new route proposals would be subjected to "close scrutiny," but this was a far cry from the language in that January, 1951, decision, in which Ryan took part, which stated that "applicants face a major, if not insurmountable task in seeking approval of future route proposals."

Following that decision, CAB policy was to approve only what it considered to be "economic interchanges." Effect of that policy was virtually to maintain the route status quo for larger airlines, while prodding smaller carriers into mergers.

There are no indications now that CAB is satisfied that the end is in sight for economical mergers. But there are definite signs that route expansion will not occupy a back seat for the duration of the merger era.

Best estimates indicate that new policy will be one of intermingling new route grants and interchanges.

The immediate job for CAB, however, is to consider which of the route applications properly belongs in which of the three new cases. Each proceeding will be the subject of a "consolidation order" to be issued by the Board. Thereafter the cases will go on to public hearings, oral argument, etc. Because of the enormous size of each one, it is unlikely that any will be finally decided this year.

But the "route rush" does not stop with these three cases. In opening the door for what it apparently considers the most pressing, CAB had to by-pass applications also on file for several years for new routes in other areas. These applicants also want action on their proposals and are so advising CAB and Chief Examiner Francis W. Brown, who is charged with setting dates for procedural steps.

One Board official said it is "going to be hard" to hear some applications and defer others.

But CAB's executive director James M. Verner said the three cases now under way involve the earliest applica-

tions on the Board's docket and the current aim is to "hammer away" at the big backlog of pending route cases awaiting CAB disposition, in a manner most equitable to all.

Meanwhile, with a significant relaxation of government control in sight, most of the airlines are gearing for a period of lengthy and expensive route proceedings.

Many of their applications are "defensive," necessitated by the knowledge that some CAB members feel the need for more competitive services. But a great majority envision expansion into new markets and see the next few years as the proper time to push for it. •••

News Briefs

New Assistant Secretary of the Air Force is to be **Roger Lewis**, director of sales for Curtiss-Wright. Lewis picked up considerable procurement experience during World War II.

The **Vickers Viscount** seems to stand up well to a Canadian winter. Its turboprops started without trouble after standing for 12 hours at 17° below with a 10-mph wind blowing, during winterization tests.

European air strength for the free world stands at only **3,800 combat aircraft**. Plans call for almost three times that many by the end of 1955.

Big problems on the calendar of the **Air Coordinating Committee** these days are: whether transports, spares, and airways should continue to receive equal priority with military on materials when CMP is modified; what to do in Galveston, where USAF is contemplating a move into the municipal airport.

A record-breaking year was chalked up by **Ryan Aeronautical** during the fiscal year ending last October 31. Net profit was \$878,359, or \$2.23 per share. The good news represented an increase of 118%.

Sales reached over \$326 million for **Curtiss-Wright** during 1952, up 85%. Current backlog is now over \$1 billion, including letters of intent.

Two automobile firms with big aviation interests are talking merger, and have been exploring the subject for some time. The two are **Kaiser-Frazer Corp.** and **Willys-Overland Co.** K-F has contracts for the Fairchild C-119 and the

Chase C-123, Willys for landing gear and other equipment.

A net income of \$4.3 million went to the **Atlas Corp.** last year, or some \$2.53 a share, according to President **Floyd B. Odlum**.

Four **Douglas DC-6B's** are scheduled for delivery to **Japan Air Lines** in the latter part of 1954 and early 1955. The order followed a visit to Douglas by a group from the carrier.

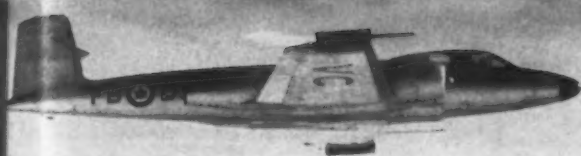
A possible merger is in the offing between **Aerojet Engineering Corp.** and **Crosley Motors, Inc.** The two firms are owned by **General Tire and Rubber Co.**, 86% and 72%, respectively.

The **USAF** may participate in air shows this year, following tentative approval by the Department of Defense. Plans would include AF participation in shows at Detroit in July, Dayton in September, and various celebrations of the 50th Anniversary of Powered Flight.

All-cargo operations across Canada by **Canadian Pacific Air Lines** are being hotly discussed in Ottawa. Cross-examination of witnesses revealed that **Trans-Canada Air Lines** has ordered three **Bristol 170** freighters for all-cargo service between Toronto and Winnipeg this fall.

A joint flying school should be set up for the allied nations, either in the United States or in Canada, according to the commanding general of the Norwegian Air Force, **Lt. Gen. F. Lam-brechts**, who is dissatisfied with the present policy of training Norwegian flyers in small groups at various schools.

AMERICAN AVIATION



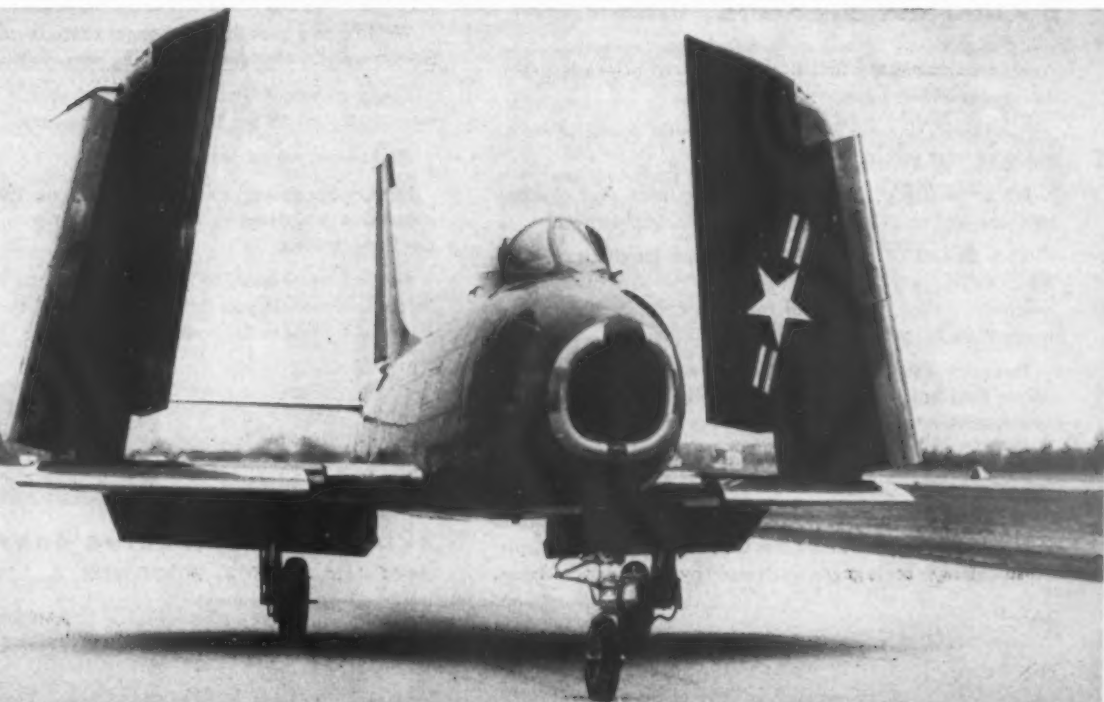
Wing-tip rocket pod installation has been revealed on the Avro Canada Mark 4 CF-100, all-weather, long-range radar fighter. Firing test is shown in photo. To be in volume production for RCAF this summer, fighter is first rocket-armed aircraft equipped with internally stowed rockets in the British Commonwealth.

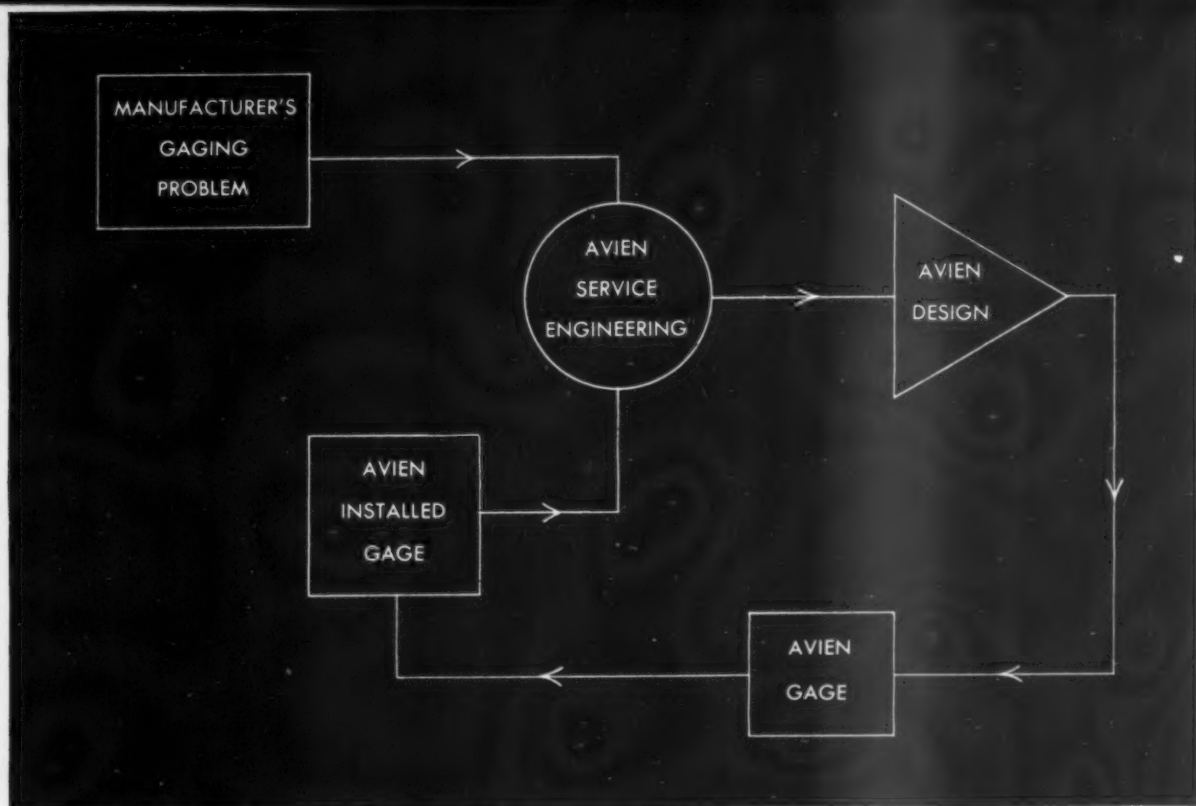
The Military Picture



Atomic bomb can be carried from carrier or land stations by North American Navy AJ-2, largest carrier-based attack bomber, an advanced version of the AJ-1 Savage. Bomber weighs 26 tons.

Folded wings provide convenient storage of North American Navy FJ-2 Fury aboard aircraft carriers. Swept-wing jet fighter boasts speed in excess of 650 mph and is armed with four 20 mm cannon.





Are you using this "Servo" principle?

This Avien "feedback" system has important advantages for plane-makers and engineers.

Avien was among the first to use the servo principle in the design of aircraft gages.

But there's another servo principle that Avien offers to every aircraft manufacturer.

It's a "feedback" system that has provided a lot of effective answers to aviation's most complex problems.

This scheme is basically simple. Once handed the problem, Avien tailor-makes gages for the aircraft. Avien engineers follow through all the way, from drawing board inspiration to instrument panel installation.

But after installation is completed, Avien's job continues. Avien field engineers constantly check and test the gages *in service*—and feed back information to design headquarters.

This "closed-loop" operation has aided Avien in the perfection of some remarkable products.

We've designed Cylinder Head Temperature Indicators and Jet Tailpipe Thermometers that use the servo principle. Result: longer scale gages, unaffected by lead characteristics.

We've designed a Jet Engine Thrustmeter that computes gross thrust from measurement of tailpipe pressures and ambient pressures.

We've made over fifty fuel gages that measure fuel quantity by weight, eliminating moving parts in the fuel tank.

Every month, Avien produces over 10,000 major instrument components for the aviation industry.

Right now, we have two goals.

First, we're going to keep on solving the toughest instrumentation problems in the industry. If you think you've got them, call us.

Second, we're going to keep on adding the best engineers in the business. If you think you're one of them, send your detailed resume to Department E.



AVIATION ENGINEERING CORPORATION
34-56 58th STREET, WOODSIDE, L. I., NEW YORK

AMERICAN AVIATION

The Score on Aid to Airports

June 30, 1947-June 30, 1953

| Airport Service Type | Tentative Allocations | | Number | | Federal Funds |
|---------------------------|-----------------------|----------------------|---------------------------|-------------|----------------------|
| | No. Airports | Federal Funds | Grant Agreements Projects | Airports | |
| Secondary | 485 | \$13,190,991 | 688 | 478 | \$12,980,237 |
| Feeder | 322 | 21,612,450 | 529 | 305 | 20,530,359 |
| Trunk | 250 | 41,422,666 | 581 | 244 | 39,825,479 |
| Express | 67 | 24,523,708 | 207 | 64 | 22,947,880 |
| Continental | 31 | 29,653,576 | 140 | 31 | 27,784,446 |
| Inter-continental | 16 | 38,299,585 | 103 | 16 | 36,624,133 |
| Inter-continental Express | 9 | 25,149,994 | 74 | 9 | 23,695,265 |
| Seaplane Bases | 18 | 156,156 | 18 | 18 | 156,156 |
| TOTAL | 1198 | \$194,069,126 | 2340 | 1165 | \$184,543,996 |

Note: Under the Act an additional \$6,507,672 has been appropriated to the Territories of Alaska and Hawaii, and Puerto Rico.
Source: CAA.

Airport Aid Program Comes to a Boil

With fate of entire program due for decision soon, operators are split over private vs. federal financing.

By DON M. WILSON

THE CAA'S Federal Airport Program faces a big reduction in budget funds for fiscal 1954 and may be cut off entirely as a result of the new Administration's efforts to balance the national budget.

The feeling that the time for decision is near is reflected in a statement to AMERICAN AVIATION by Charles F. Horne, then Civil Aeronautics Administrator, branding as "absolutely without credence" a rumor which made him a party to a plan to scuttle the Federal Airport Program by suggesting to the administration budget cuts and a plan to incorporate the duties now handled by 420 CAA personnel in the Office of Airports into the Office of Federal Airways.

The rumor started when an unnamed airport operator circulated a letter to the Presidents of the Airport Operators' Council, the Association of American Airport Executives, and to other airport officials "charging the Administrator with acts contrary to the interests of the airport program in order to achieve the good graces of the new Administration." Horne further supported his stand by stating, "It was at my insistent pleading that the program was not 'sacked' during the twilight period of the late Administration."

All is not harmony among AOC and AAAE members, since AOC members, representing the large terminal airports, feel reluctant to resist any further cut-back of ex-President Truman's \$30 million Federal Airport Budget for fiscal 1954, since they are courting a new philosophy of airport development financed by private and public funds rather than by federal aid.

Cyril C. Thompson, the executive secretary, expressed it this way: "As

a representative group of airport operators we feel that any change which the new administration will make should not be feared, but should be taken in the light of benefiting the civil aviation program as a whole through efficient and streamlined methods in administering an airport program."

More Aid Now

On the other hand, AAAE representatives want more federal aid now, and stand vigorously opposed to any revamping of the airport program unless the change would bring about increased funds. This point can be emphasized by local communities' action in putting up \$125 million for airport developments, but a reluctant Congress will not appropriate the matching funds. The two organizations appear to differ in degree and enthusiasm, but do not oppose each others common interests.

A current trend to finance airport improvements from public and private sources has come about due to the difficulty of obtaining sufficient federal aid and the restrictions imposed on sponsors by CAA when planning the improvements and the operations of the airport.

The City of Toledo is representative of this trend. The city has acquired a new airport site on which it plans to begin a building program financed completely by private and public invested capital. The old airport, which was built partly with federal aid, will be abandoned by the city. However, it is believed that the CAA will not let the City of Toledo off the hook so easily, for in the Sponsor's Assurance Agreement it states, "Such use of a federal supported improvement shall be for the useful life of the improvement but not longer than 20 years."

Furthermore, CAA is hoping for a transfer of sponsor's obligations from the old airport to the new site, but Toledo has refused the order and is seeking legal advice on this matter.

The crux of the whole problem is that airport operators have discovered to their dismay three undesired features of federal aid since its inauguration:

- Federal aid is a very small fraction of their airport improvement costs;

- CAA regulations restrict master planning of airports to suit local airport conditions;

- The "joint use clauses" are very burdensome and do not lend themselves to profitable operations.

An example of the first undesired feature is the situation in Ohio, where federal grants totaled \$325,041 for airport improvements within the state last year. Since two airports alone at Cleveland and Toledo have improvement and expansion plans totaling \$25,000,000, the Government's contribution is indeed a small token.

"Recapture Clause"

An additional thorn in the side of airport operators is the "recapture clause," associated with surplus airports which were built by the military during World War II and deeded to local communities after the war ended. The joker in the deed is that in case of a declared emergency the military can walk in and take over the airport, and this is what has been taking place these past two years without any recourse available to the airport operator at this time.

Many airport operators today are requesting of the Civil Aeronautics Administrator relief from the "joint use clauses" in the Sponsor's Assurance Agreement, and the "recapture clause" in the surplus airport deed. Their argument is that in order for them to acquire the necessary funds from private and public sources the airports have to be clear of any government attachments, and that the Administrator has the authority under Section 4 of Public Law 311, 81st Congress, to grant these releases.

Appropriations Lag

According to latest figures obtainable from CAA (see table below) the FAP has been suffering from a Congress less inclined to appropriate the necessary funds all along.

The FAP was authorized by Congress in 1946 to spend a proposed \$500,000,000 on airport projects in order to "establish a nation-wide system of public airports adequate to meet present and future needs of civil aeronautics." This amount was to be spent over a seven-year period which was later extended five years to June 30, 1958.

A total of \$146,729,672, or about 67% of the total \$195,529,672 scheduled for spending by the end of the fiscal 1953, was spent during the 1947-50 period. The remaining 33% was scheduled for the following three years.

FAP Costs

| | |
|------------|--------------|
| 1947 | \$42,750,000 |
| 1948 | 30,662,500 |
| 1949 | 36,817,172 |
| 1950 | 36,500,000 |
| 1951 | 21,200,000* |
| 1952 | 15,850,000 |
| 1953 | 11,750,000 |

TOTAL\$195,529,672

* Note: An additional \$15,500,000 was appropriated by Congress but it was recalled by the Budget Bureau and President Truman after the Korean outbreak.

Since 1950 the emphasis has been on the military needs of large airports. Korea began the trend toward appropriating larger amounts of airport funds for terminal airports which would be of aid in the national emergency. However, not all of the small airports have been entirely cut out of the picture, for under defense requirements some airports have been appropriated funds because of agriculture, oil, and other business interests located at the field.

From the table on page 25 it can be seen that secondary airports are obtaining a very small amount of FAP funds, however, since from the very nature of their operations any construction projects would be of low cost. For the 485 secondary airports, or 40% of

the total 1198 airports listed under the tentative allocation column, some \$13,190,991 was spent, only about 6.9% of the total \$194,009,126.

A difference of \$1,520,546 exists between FAP total costs (table above) and the tentative allocations total (table on page 25) because CAA has not allocated the amount to any particular projects, but plans to do so by the end of the fiscal year 1953.

Feeder Airports

The 322 feeder type airports represent 26.9% of the total number of federal-aid airports, but shared only \$21,612,450, or 11.2% of the total federal funds allocated.

The 807 secondary and feeder class airports, although they represent about 68% of the total number of airports offered aid, received only 18.1% of the total funds appropriated.

The remaining airports, or 32% of the total, have received the lions' share of federal aid: about \$158,893,373, or 81.8%. These class airports include: Trunk, Express Continental, Inter-continental, and Inter-continental Express.

The problems being experienced today could very well inspire airport operators to attempt several improvements for the future:

- With united effort and action they might achieve some success by fighting any further program cuts;
- With the same concerted unity they might acquire relief from "joint use clauses" and "recapture clauses" by appealing to the Administrator;
- With an eye on the future they might initiate plans for a new aid program divested of all red tape and no strings attached;
- With a determined policy by airport management, community cooperation and interest in each airport could be stimulated, a policy much neglected by airport operators.

However, at present it appears that the "die has been cast." Within the next few weeks the CAA budget will come up before Congress, and then it will be known whether the Federal Airport Program funds will be slashed or if the program itself will even survive the onslaught.

New Measuring Device

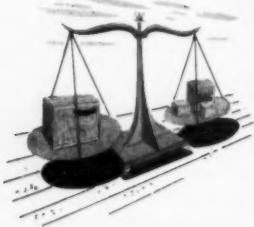
Safe Flight Instrument Corporation is manufacturing a new machine tool precision measuring device, called the G-12 Goniometer Collimator. Also used for inspection purposes, the new optical device is said to measure angles with great precision, such as bedway flatness to within 0.00007".

Facts... and Figures!

Figure:

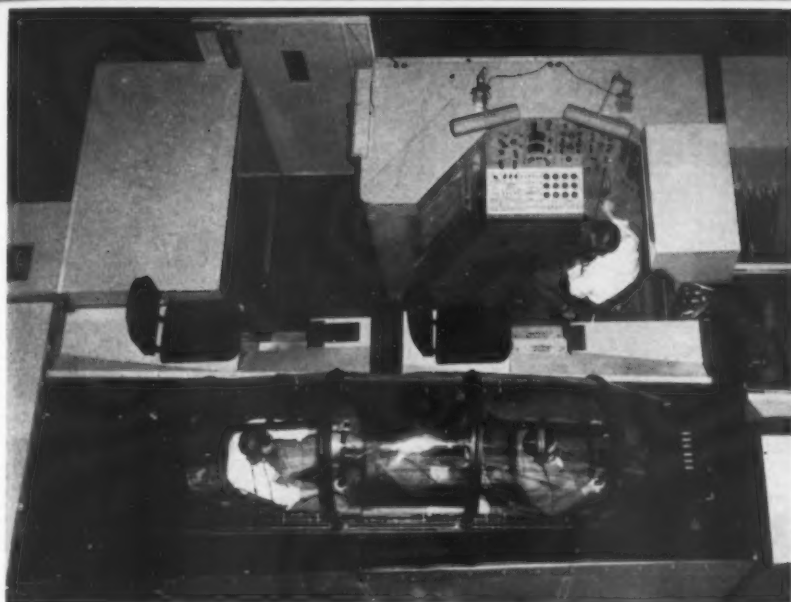
Airline or hemline, the going's gussy when March moves in to buffet a body's trim tabs. Here, Modest Miss Valere Duncan shows why so many habitues of Southwest Airmotive's placid porch sally forth this month to find vantage spots on wind-swept downtown street corners. This storm-tossed figure is 26, 110 lbs., 5' 4", and has black hair and eyes.

Fact:



In buying and selling factory-new parts and accessories, Southwest Airmotive performs many valuable "Extras" for its vendors and customers. It helps them analyze problems and needs and has turned down sizeable orders to protect customers against costly overages in their inventory. When you sell to, or buy from, the SAC Sales Department, you ally yourself with a force of specialists interested not so much in today's order as in tomorrow's growth and good reputation.





LINK'S FIRST B-47 simulator was delivered to the USAF 14 months after signing contract for its development.

Link Expansion Ahead; Simulators Boom

New designs, including F-89 unit, contact flight simulator, and helicopter trainer, mark progress.

By WILLIAM D. PERREAULT

THE DESIGN and production of flight simulators for the military services is big business. Nowhere is this more evident than at Link Aviation, Inc., at Binghamton, N. Y. There the company has disclosed that it has a backlog of \$70 million, with numerous contracts in the mushrooming stage likely to push this to and above the \$100-million mark soon.

Some of the highlights which emphasize the dynamic nature of Link's expanding program include:

- **Research**—Link is putting considerable time and effort into the design of a simulator for helicopter training and is pushing its entry into several new fields where its combination electronic and mechanical skills will provide diversification.

- **Expansion**—Link is putting finishing touches on plans to expand its Binghamton operation by joining two main buildings of the present plant and provide almost 15% increase in production space.

- **Sub-contracting**—Wurlitzer Corp. in upstate New York is scheduled to complete production of the first Link C-11B trainer this month with parts

manufactured at Binghamton.

- **New designs**—Completion of the first Northrop F-89 flight simulator, appreciably more complex than even the B-47 simulator, is scheduled later this year. The first military P-1 contact flight trainer is also scheduled for early service.

Design and Blood

Link's improved position in the highly competitive and pioneering field of simulators stems from two main arteries: the successful design of the company's first jet simulator, the C-11, and new blood on the management side in the person of E. Allan Williford (see cover) to make the most of this development. Williford joined the company in a crucial period in the C-11 sales program.

The C-11 jet trainer was initially developed to duplicate the Lockheed F-80 in great detail. When the U. S. Air Force, which sponsored the program, realized that the completed trainers represented a cash value about eight times what they had initially planned, Link was asked to develop a general purpose trainer, based on the F-80, but with many less frills, to permit wider application and lower cost.

The C-11 trainer which resulted has

been produced in greater numbers than any other flight simulator and appears to have a long useful life ahead. The principal shortcuts taken with the C-11 include elimination of the engine starting provisions, the complex emergency failure provisions, and dependence on an external power supply — luxuries which do not detract from basic jet training requirements.

Williford's arrival on the scene at this time was the work of Link founder Ed Link, president of the company since 1935. He had designed the first and most famous of the Link trainers while working in his father's organ factory and trying to get flight training at cheaper rates. Link piloted the company's course during the development period, which reached its climax during World War II with the production of a Link trainer every 45 minutes and the training of a half-million airmen in Links.

It Paid Off

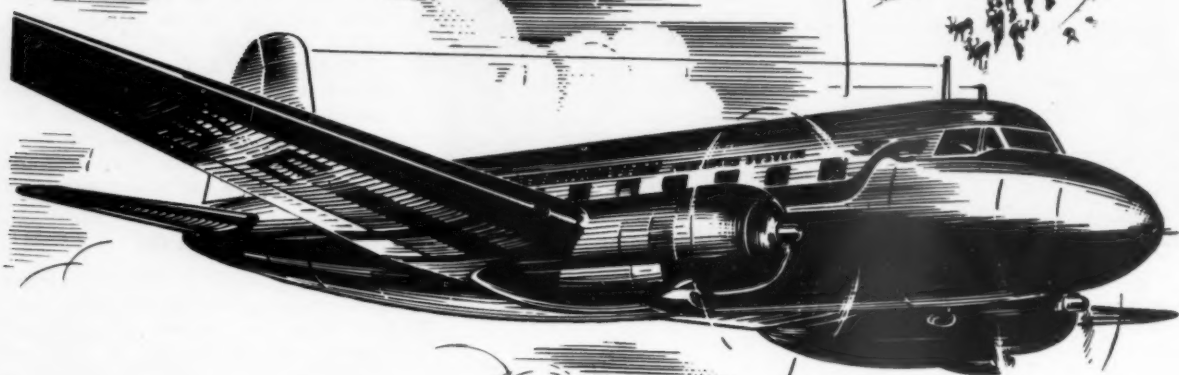
The postwar slump in aviation, even more aggravated in airman training, found the company in a weak position in the late Forties. In February, 1950, Ed Link brought in Williford as vice president and general manager. Williford's qualifications closely matched Link's needs. He had 24 years in sales activities at Union Carbide and Carbon Company, advancing from salesman to general sales manager of the Carbon Products Division. He had an electrical engineering background and immediately prior to joining Link had served as vice president of General Aniline and Film Corp. and general manager of Ansco. The combination paid off in directing Link.

It is impossible to get gross sales or net profit figures on Link's operation, since it is a privately controlled corporation. With these two avenues of gaging company progress closed, the current backlog of \$70 million and the company's employee bonus system are two important yardsticks of prosperity. The bonus system distributed \$300,000 among 1,230 employees at the end of 1952. Perhaps this is one reason why Link's employees, now up to 1,600 in number, are not unionized.

Williford's recent appointment to the presidency of Link, succeeding Ed Link who remains as chairman of the board and director of research and engineering, was the final shift of top level responsibility, which has been underway since 1950.

The most difficult job Link has approached in its business life has been the prototype Northrop F-89 simulator. The inclusion of a complete radar gunnery system plus target simulator makes the F-89 more complex than the Boeing

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B-47 simulators Link designed and built. The details of the new design are still classified but the completed design will disclose many new concepts of simulation.

Meanwhile there are other fields where Link is making inroads that are not so classified. Link expects to supply flight simulators to the manufacturer of the first U. S. built jet transport for training of airlines crews and as a sales tool in the early stage of prototype development. Chief Engineer W. W. Wood, who is also a vice-president, is now working actively on a helicopter simulator but this offers many real problems. Price problems alone are a major obstacle since simulator costs will be high in proportion to helicopter cost.

The P-1 contact trainer is another example of Link's newer items. This is the device originally built for the University of Illinois shortly after the war. The University tested two groups of pilots, one group using regular flight training methods and the other starting out on the P-1. The results were such that the U. S. Air Force has now ordered a limited number for additional tests.

The P-1 trainers are built up from

T-6 trainers that have been washed out in accidents. The framework and controls are used to provide a low cost housing for the trainer, including the Link C-8 trainer mechanisms. This is the old pneumatic operated Link which is in such wide use today. Link is still building a few of these for the U. S. Air Force but the P-1, instead of providing the unrelated cockpit arrangements of the C-8, is the actual T-6 configuration.

The contact trainer is used in combination with a cyclorama, a circular room in which the trainer is located and which is painted to duplicate a scene at a fixed altitude. Operating without the hood of the C-8 type trainer, the pilot can learn many types of maneuvers on a contact flight basis, learn radio procedures and other important aspects of early flight training before ever getting into an aircraft.

Trailer Unit

An interesting application of the Link C-11B trainer is that of the National Guard, which has recently taken delivery on one of the USAF units. The National Guard is using the trailerized unit, which can be converted into a 14' by 20' classroom by a few turns of a crank, to bring its training program into the heavily populated areas, making it unnecessary for Guard reserves to go to the airport for familiarization work.

Link has also trailerized the Navy's simulators for the McDonnell F2H2 and F2H3 fighters. The newest Link Navy simulators feature a rough air generator of Link design which will do much to add realism to pilot training. The entire trainer body is mounted on a heavy gage frame which is hydraulically oscillated at controllable frequency and severity to match the buffeting conditions experienced in various rough air conditions.

All branches of the armed services are turning to Link for specialized simulation devices. These demands are highlighted by Link's work on the E-26 gunnery trainer, a device which projects silhouettes on a screen and electronically scores rounds, hits, and times in sight as the gunner gets in his practice runs. Link is also manufacturing the specialized instruments used in simulators for other companies.

Williford is certain the present emphasis on cutting the Federal budget will bring more business to the simulator manufacturers. Nonetheless, the company is starting a determined diversification drive which will see it entering other industrial fields where its experience will pay off. It hopes ultimately to split its business about 50/50 between trainer and industrial work.

NEWS BRIEFS

First Viscount service for BEA will be to Zurich, Istanbul, and Cyprus in the week of April 19. Geneva service will begin June 1, and Copenhagen and Stockholm will see the turboprop aircraft a month later.

A petition to designate Los Angeles International Airport as a Federal airport of entry has been submitted to the Secretary of the Treasury by the Board of Airport Commissioners at Los Angeles. PAA and Compania Mexicana de Aviacion at present have landing rights granted by the Commissioner of Customs; other operators must obtain special permission from local customs officials or go to San Diego or Calexico.

The Danish Air Force has entered a Republic F-84G Thunderjet in the London-New Zealand air race. It is the only American jet aircraft entered thus far.

An anti-oxidant for motor and aviation gasoline has been announced by the Koppers Co., of Pittsburgh, Pa. The product is designed to hinder formation of acids which result in corrosion and sludge.

A three- to four-week tour of west coast plants by the CAA's jet evaluation team is scheduled, with visits to Douglas, Lockheed, Convair, and Boeing already set up.

New jobs have been announced for two former Defense Dept. officials. Robert A. Lovett, former Defense Secretary, joins the banking house of Brown Brothers Harriman and Co. as a general partner; former Munitions Board chairman John D. Small is now a vice president of Pressed Steel Car Co., with his offices in New York.

A one-piece extruded aluminum rotor blade for helicopters and convertiplanes, developed by Jacobs Aircraft Engine Co., will be engineered and tested by that firm, under a development contract granted by the Air Materiel Command. Rotor tests are scheduled to begin soon on the Jacobs Model 104 Convertiplane.

The IATA Clearing House in London had a record turnover of \$218,240,000 in 1952, an increase of 28% over the 1951 volume of \$169,950,000. The amount of actual cash required to settle the 1952 volume was only \$13,842,000, the remainder being settled by offset.

The Man on the Cover

E. ALLAN WILLIFORD, Ed Link's successor as president, came to Link Aviation in February, 1950, as vice president and general manager. He is credited with pulling Link up to its present \$70,000,000 backlog.

Prior to joining Link he served as vice president of General Aniline and Film Corporation and general manager of Ansco. A graduate of the University of Illinois, Williford spent 24 years with the Union Carbide Company, rising to the post of general sales manager for its Carbon Products Division.

While associated with National Carbon and Ansco he served as president of the Society of Motion Picture Engineers and was an active member of Picture Pioneers. He also has been president of the Theatre Equipment Supply Manufacturers Association and vice president of the National Electrical Manufacturing Association.

Currently he is a director of the Associated Industries of New York State and is prominent in local civic activities in Binghamton, where Link is located.



VIEW OF OVERHAUL SHOP at Courbevoie.

Incentive Speeds Air France Overhaul

THE ENGINE overhaul shop of Air France, at Courbevoie, on the outskirts of Paris, is now overhauling 55 engines a month, and an expansion is planned to enable it eventually to turn out 100 reciprocating and 50 jet engines monthly.

The shop has improved its production substantially in the past few years. One of the principal reasons for the increase has been the incentive system, under which a worker can add to his monthly wages as quantity and quality of overhaul goes up.

The center, which was certificated some time ago by the U.S. Civil Aeronautics Administration, has been handling Wright 18 BD and Pratt & Whitney R-2000-13 engines and has just added a line for P&W R-2800 CA-18's, the powerplant used in the Breguet 763.

Meanwhile, preparations are being made to overhaul the Wright Compound engines that will power the Air France 1049 Constellations, and studies are proceeding on organization of lines for Dart and Ghost jets, which the company will use in its Vickers Viscounts and de Havilland Comets, respectively.

The present Courbevoie shops, which employ 375 people, contain 5,800 yards of floor space, and a new building containing 6,000 more is to be erected on an adjoining lot. Construction is to start this spring, and the building is to be finished in 15 months, according to Jean Becq, director of the installation.

It will be some time before the shops reach the goal of 150 overhauled engines monthly. Within five years, at the most, it is planned to have capacity

up to 80 piston engines and 30 turbines a month.

Total overhaul time on the BD engine is now about 530 hours, including repair of spares and testing, while the R-2000-13 is being handled in 410 hours. In 1950, the former engine was taking 850 hours, and the latter 700. Including testing, the BD now takes 20 working days, and the R-2000-13 requires 15 days.

Cost of overhauling the Wright engine is running about \$7,100 per unit, including labor, parts, testing, and general overhead. The P&W cost is \$4,600, on the same basis. Air France has 157 Wrights and 197 P&W's, and expects to have 68 Wright Compounds for its Super Constellations.

Primarily responsible for the improvement in overhaul activities is the incentive system, which is based on the number of engines handled in a month, and the quality of the work done. For example, if an engine were returned to the shop with a defect after only a few hours' running time, this would detract from the incentive score, even though a large number of engines had been handled during the period.

Under the system, a worker in the lowest rank can collect a bonus of about \$20 a month. An average worker can make about \$35 extra. Inasmuch as French wages are low, by U.S. standards, this is a considerable incentive.

Because it is a long way from sources of supply, the Air France overhaul center plans about 18 months ahead on parts. Its inventory of Wright parts will run \$5,000,000, while P&W total will be \$2,000,000.

Propose Amendments To Airport Act

Amendments to the Federal Airport Act have been introduced to Congress by the Civil Aeronautics Administration which would:

- Enable many Class 3 airports to be designated as Class 4 for certain purposes:

- Remove certain present limitations and conditions attached to appropriations for rehabilitation or repair of Federally damaged public airports.

Under the new proposed standards, airports having, or to have upon completion of the project, one or more paved runways of 4,500 feet or more, plus 0.25 feet for each foot of elevation above sea level, shall be classified as Class 4 or larger airports for purposes of the Federal Airport Act, whether or not they meet all the standards recommended for such fields in CAA's "Airport Design" bulletin.

The reclassification proposal is based upon the belief that Congress intended that all airports with paved runways generally capable of accommodating the larger commercial transport aircraft would be classified Class 4 or larger for purposes of the Federal Airport Program, which calls for specific Congressional authorization of grants of funds for Class 4 or larger fields.

At present, specific authority from Congress is not required for the development of a Class 3 or smaller airport, and the Federal share of project costs for the development of such an airport must be 50% of the cost. On the other hand, in the case of Class 4 or larger airports, CAA may grant the sponsor up to 50%.

The other proposed legislation would amend Section 17 of FAP to provide that appropriations made for rehabilitation and repair of damage done to airports by Federal agencies shall remain available until expended, notwithstanding a present provision limiting their availability to June 30, 1953.

The extension of time is deemed necessary because:

- Due to delays experienced in procuring certain necessary materials and supplies, many public agencies will be unable to begin or complete such rehabilitation and repair work by the June 30 deadline.

- Such work is sometimes combined with airport development work under the Federal-aid Airport Program and cannot always be completed in one stage, but must be accomplished by stage construction over a period of years, due to the financial limitations of the local sponsor.



TWO-PLACE MC-4 in flight.

CAA Certificates McCulloch MC-4



MULTIPLE VEE-BELT drive, said to reduce vibration and simplify maintenance on MC-4 tandem rotor helicopter, is shown to former CAA Administrator Charles F. Horne by Russell E. Gage, general manager of McCulloch Motors Aircraft Division in Los Angeles.

MC-4 Specifications

| | |
|------------------------|---|
| Certificate number |6H3 |
| Configuration |Tandem, overlapping, counter-rotating rotors |
| Number of rotor blades | ...6 |
| Engine |200 hp, air-cooled, standard horizontal engine |
| Cockpit arrangement |2-place, side-by-side, dual control; optional arrangement for three-place |
| Performance |Maximum certificated speed .....90 mph |
| | Operating speed, sea level |
| | at 75% power .....85 mph |
| | Service ceiling .....10,000 feet |
| | Maximum rate of climb, sea level ..800 fpm |
| | Landing speed .....0 mph |
| | Range at 75 mph .....200 miles |
| | Weight empty .....1600 pounds |
| | Useful load .....700 pounds |
| | Gross weight .....2300 pounds |
| Dimensions |Length .....32 ft., 5 in. |
| | Height .....9 ft., 3 in. |
| | Rotor diameter .....23 ft. |
| Landing gear |Non-retractable, tricycle type, full-swivel nose wheel |
| Fuel capacity |35 gallons |
| Transmission |Multiple vee-belt main drive; right angle reduction gear motor drives; over-running clutch |

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Howard Lambastes Industry Safety Tactics

Don't blame the pilot for "errors" that are built into aircraft; industry attitudes and techniques hit.

By BEN O. HOWARD

THE ATTAINMENT of greater flying safety is as simple and straightforward as it is important. It only requires that we do the clearly evident things to reduce the frequency of our crashes.

The importance of increasing safety becomes obvious when the records are objectively analyzed. If so examined they will disclose the fallacy of equating safety on a loss-per-mile or loss-per-hour basis instead of the more factual measure of loss per unit of exposure to crash. It will be found that the risks associated with flying are some 95% the result of the flight having been made and five per cent the result of the flight time and distance involved. The records will also show that in the last four-fifths of our domestic scheduled operating experience we have reduced our fatality rates per unit of exposure less than 10%.

The greater sensitivity of our more modern airplanes to crash exposure, as well as their increased costs, should emphasize the need of increasing our safety efforts. It will be found that the crash rates are proportional to size and complexity, which means that the crash costs for equivalent flight exposure vary as the square of the cost of the airplane. It should be particularly sobering when the records show that if we replaced the present DC-3 and DC-4 domestic schedules with the more modern two- and four-engine airplanes, the average crash rate for the whole domestic service would be doubled.

We should also find it disturbing when the records show that the DC-3, which is unlicensable under today's requirements, is five times safer than the DC-6 and Constellation and nearly three times safer than the DC-4 and Convair-Liner. On an equal exposure basis, it is by far the safest airline transport in general use today, and its record should throw considerable suspicion on our present regulatory concepts of safety.

Besides the very important humane aspects involved, it should be economically feasible to reduce the crash expectancy to less than half its current level. The obstacles that must be overcome in making such gains are largely psychological and not technical. It will take only a willingness and a little determined effort directed at the prevention of crashes that are sure to happen if not prevented, instead of the prevailing concept of a crash as "one of those things"

just because someone violated a rule, or some pilot failed to push some handle just right.

A classic example of this strange willingness to tolerate crashes is the case of the DC-4 that aborted a take-off at LaGuardia a few years ago. This crash caused over forty deaths and after long and exhaustive investigations the CAB concluded that the cause of the crash was the fact that the gust lock was not disengaged before the take-off was attempted.

Five Years Later

As a result they decided on six items of required corrective action, none of which was even related to a gust lock. Five years later it was decided to require protection against this particular hazard but only in new designs, and hundreds of DC-4's and DC-3's are still flying without this finally required safeguard.

This reluctance to correct the cause of crashes that can be blamed on the pilots is not limited to civil aviation.

For example, the first Flying Fortress delivered to the Air Force nearly twenty years ago was crashed and burned right in the middle of Wright Field while attempting a take-off with the gust locks engaged and they have been piling up records of such cases ever since. Only six weeks ago, nearly ninety young men were killed in the worst crash in aviation as a result of the same thing, according to the published accounts. The thought that a rubber band could have assured the complete unlocking of those controls should be a little sickening.

Crash Causes

There are many different categories of crash causes. Some can be completely eliminated with the resulting positive prevention of the related crash, and others can be treated so as to reduce the exposure and the frequency of the related crashes.

Space will permit reviewing only a few representative types.

One cause of accidents that has resulted in the deaths of some 8,000 Americans, and which is perhaps the most damning example of what has been tolerated, is ironically enough the simplest of all to remedy. These crashes fall into a category that I call "mis-use of cockpit controls," and include the crashes resulting from the misuse of all except the primary flight and power controls.

The gust lock crashes just mentioned are typical examples. In essence, they are crashes resulting from what the flight crew did or did not do *to* the airplane, rather than what they did *with* the airplane. They represent approximately one-third of all crashes from all causes, in spite of the fact that they can be positively prevented by simple and obvious mechanical means.

Nearly 75% of these crashes could have been avoided had all the airplanes been built to a requirement that called for protection against the hazardous misuse of the various controls at least equal to that existing for the same controls in other similar type airplanes. The means of preventing the remaining 25% are simple and clearly indicated.

These crashes are usually, but improperly, charged to pilot error.

I contend that a crash that involves one model airplane and cannot happen to another model of the same general category is a result of design error, since the pilots are the same in both cases and only the airplane can be responsible.

Design Error

I submit that any airplane model having a higher frequency of any given type of crash than any other model in the same category, is below par and the crashes are a result of design error, since par is demonstrated by the airplane with the lowest crash rate. I also submit that we are evading responsibility when we charge a crash to pilot error when the pilot is only guilty of doing what other pilots have already established as something to be expected of a qualified pilot.

It is up to the designers of the aircraft to devise a machine that can safely tolerate the circumstances to which it will be exposed. They must design its wings to handle the expected air loads and they should design its cockpit to tolerate safely the expected performance of the man who is to fly it.

Our failure to so design the cockpit is responsible for fifteen times as many crashes as result from structural failure, yet there is very little comparison in the engineering dignity we give the two subjects.

We seem willing to shrug off the responsibility of providing safe controls by leaving it up to the pilot to read his check list and do things right. That makes about as much sense as leaving the safety doors off the openings to elevators in busy office buildings and instead just putting up a sign warning folks not to step through unless the elevator is there. To depend on a sign to keep people from falling down the

open shaft is like depending on a check list to keep the pilot from forgetting something in the cockpit—it just doesn't work and the records prove it. Reduced, it simply means that any airplane that requires the use of a check list for safety is in fact unsafe.

Check-List Crashes

Typical of the many crashes in this family are as follows:

- Attempting take-off with gust lock engaged as already mentioned.
- Failure to place flaps in take-off position before attempting take-off.
- Retracting landing gear before becoming airborne.
- Retracting flaps first instead of landing gear following take-off.
- Retracting flaps faster than the airplane can accelerate to the required flaps-up speed.
- Feathering the wrong propeller.
- Lowering the flaps and/or landing gear at too high a speed.
- Failure to lower flaps or landing gear before landing.

These are but a few of the crash causes that can be completely eliminated for a fraction of the cost of the crashes that will otherwise occur as a result of their neglect.

The fifth item above relates to an interesting example of the strange psychology used in our safety regulations. Two postwar twin-engine transports were crashed and destroyed as a result of the flaps being retracted too soon following a power loss on an engine during take-off.

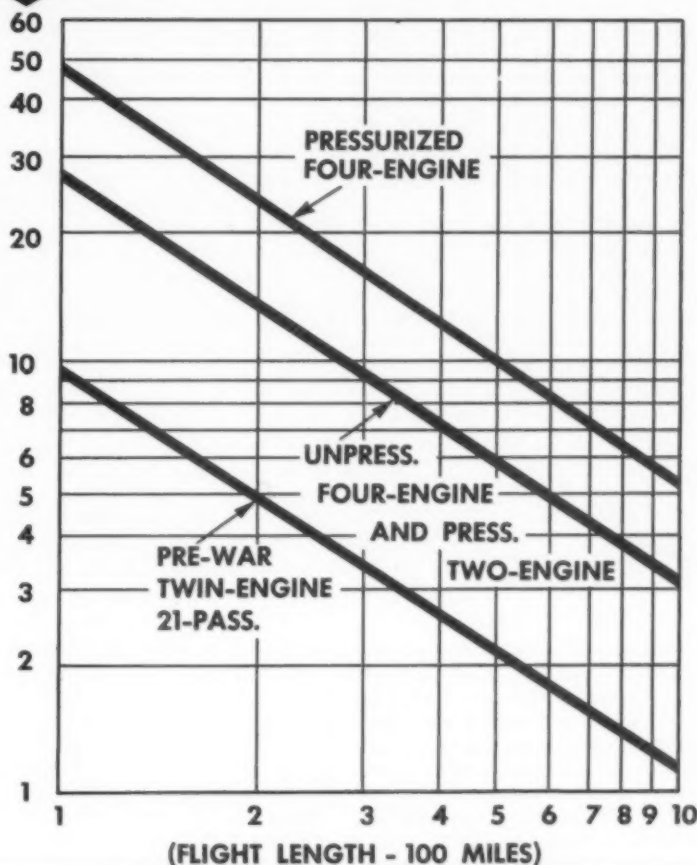
There was a great to-do and much concluding was done about automatic feathering, under-powered engines, temperature and humidity, and all that sort of thing, but no one seemed concerned over the actual cause of the crashes which, of course, was premature flap retraction. A decreasing rate flap retraction speed or a time delay in the flap retraction control circuit could have prevented the accidents.

Passing the Buck

Blaming the pilots for the premature retraction is pretty expensive buck-passing—in fact, about a half a million dollars a pass. The price per pass is going to be still higher for the newer models of the same basic design, which we can expect to crack up from the same cause if something preventative isn't done. It is a strange thing the way we spend small fortunes measuring one-engine-inoperative performance for the last foot per minute, leave real fortunes in payload out of the airplanes to meet a theoretically safe rate of climb, and then let hundreds of men be killed because we don't bother to adjust the rate of flap retraction to the attainable rate of acceleration of the airplane so

ACCIDENT EXPECTANCE VS LENGTH OF FLIGHT

ACCIDENTS PER
100 MILLION
MILES FLOWN



RISKS HAVE INCREASED, says Howard, as aircraft have "improved": a DC-3 is five times safer than a DC-6 or Constellation.

that the safe rate of climb will be actually realized when an engine fails.

The sixth item, feathering the wrong propeller, is another interesting example and one that has resulted in many fatal crashes. According to my best information it was responsible for a recent fatal crash that incurred a great deal of public protest. To prevent accidents from this cause simply requires that the feathering circuit be held open by the torque of the engine.

The many other crash causes in this category are similar in character to Items Five and Six and we can treat them in either of two ways: bury the dead, clean up the mess, and blame the pilots; or, simply fix the airplane so that the pilot cannot make the error. The choice is ours and it's just that simple!

Some 20% of all fatal crashes are a result of the incompatibility of the size and performance characteristics of the airplane, and the weather in which it

is operated. The continuation of these losses cannot be charged to the increased ratio of actual to scheduled miles flown, since the 25% reduction in cancelled mileage achieved in the past few years is more than offset by the 40% reduction in ratio of landings to miles flown during the same period.

A substantial reduction in the frequency of these crashes will result if we will give cognizance to the fact that it is just as imperative that we fit the airplane to the weather leading to the runway as it is that we fit the airplane to the runway itself. We go to endless expense of time, money, and effort exactly fitting the airplane to a dry runway in perfect weather and then accept the crashes that occur on wet runways when visibility is restricted.

The ceiling and visibility required for equal margin of safety varies as much as 300% for different airplanes presently operating under the same allowable minimums. It is obvious that

either some of the airplanes are suffering a ridiculous economic penalty, or the others are exposed to undue danger.

The military operating practices are even more disproportionate. They recognize no difference in needed visibility for any of their airplanes, even though for equal security their expensive and more important ships may well require 600% or 800% more visibility than their small and relatively unimportant airplanes. In bad weather we find the expensive airplane is either in considerable jeopardy or the less valuable article unnecessarily restricted.

To my knowledge the only work done so far toward quantitatively equating the requirements for equivalent airplane-weather compatibility has been sponsored by an individual who has been trying for years to get recognition of the need of such a thing. Since several thousand people have already been killed by this neglected hazard it should stand apparent that attention is due.

I submit that the expectancy of crashes of this type can be substantially reduced without the imposition of an increase in average operating limitations. It only requires that we face the facts and take the action indicated.

Collision Danger

I believe that collision is one of the most difficult and important problems connected with flying safety. I offer no criticism of our past record or suggestions for a cure-all means of future protection. I include it primarily to emphasize the unique challenge it presents and the need of constant cognizance of its threat to safety.

I consider it particularly important since it automatically implies total fatalities and in double measure. It might also be considered especially important with respect to third party risk, since the locale of its most likely incidence is the vicinity of a terminal which, in turn, suggests populated areas.

Another important aspect is the unique comparison of the collision hazard of an airplane with that of any other means of locomotion. As I see it, an airplane is the only carrier that does not enjoy a reduction in risk with an increase in its size as compared to the size of the other article involved. For example, a rowboat cannot cause the sinking of the Queen Mary and the drowning of everyone on board as a result of a collision between the two, but a single-place airplane can and has destroyed a B-36 as well as a DC-4 loaded with passengers.

It is a disturbing thought but we must face the fact that the smallest airplanes flying can cause the destruction of our biggest and finest airliners and all they contain as a result of a simple collision.

As the size, speed, and number of airplanes increase the problem becomes more acute and more deserving of concentrated effort toward a satisfactory solution. At first thought it would seem that the risk would be inversely proportional to the visibility existing but this is strongly contradicted by the record. It could be concluded, therefore, that traffic control, as adhered to in bad weather, is a more effective means of guaranteeing separation than is the visible presence of the other airplane.

Regardless of the benefits of traffic control, the designers of the airplanes should remember that to provide the pilot with anything less than the visibility of a pedestrian and the dodging ability of a jack rabbit is to increase the collision risk to some degree.

Needless Risks

A number of lives and quite a few expensive airplanes has been the price paid for taking needless risks during this important part of airline operations. To positively prevent these accidents requires no more than stopping the practice of taking the risks.

Two typical exposures in the family of risks responsible for these particular losses are flaps-up landings and feathered propellers. It is no more necessary to practice landing with simulated flap extension failure than it is to practice landing with the gear up to simulate landing gear extension failure. Flying around with a propeller feathered contributes nothing to the pilot's familiarization that a windmilling propeller doesn't provide, except perhaps the thrill of living dangerously and one or two practice pokes of a finger at a red button. Red spots painted on the hangar wall could be used for the finger practice.

If it is necessary to practice such things as feathering propellers and flaps-up landings, why do we not practice dumping fuel, jettisoning the emergency exits, and perhaps an occasional ditching? Before considering the subject absurd, we should remember that even under the controlled procedures used by the established air carriers, crashes resulting from these two practices have destroyed, in the recent past with fatal consequences, three of our two most expensive transport models besides causing a number of other less important losses. To positively prevent these crashes merely requires that we stop doing the things that cause them.

Many crashes have been caused by the improper conduct of a flight which was in no way related to the pilot's ability to demonstrate his proficiency in test. An intelligent man can school himself until he can pass all the usual company and CAA examinations and yet not be possessed of the intuitive apti-

tudes of a good, safe pilot. His deficiency may be the use of poor judgment, a tendency toward taking senseless chances, or caused by a sort of mental coagulation when operating under the pressure of a real emergency.

Whatever the deficiency, it is not mathematically probable that its first few disclosures will have catastrophic results any more than such results should be expected the first few times an automobile driver drives through a red traffic light. However, it is obvious that the mathematical probability of a crash increases with each repeated demonstration of the deficiency and to allow this pilot to continue these performances is to invite the eventual consequences of a crash.

The disclosures of a pilot's deficiencies which precede the final unfortunate circumstances are usually well known among his cockpit companions, but tragically enough in many cases have been unknown to his superiors until after the crash.

The average safety level of any group of pilots is naturally lowered by the inclusion of one sub-standard member. I feel that it is a fitting and a fair challenge to the new spirit of the ALPA to suggest that they assume the moral responsibility of maintaining the average proficiency and safety of their active membership at the highest possible level. In so doing, they will be performing a real service to themselves, their employers, the public, and particularly the pilot who is taken out of service if one should be removed in order to raise the average safety level of the group.

Fewer Crew Members

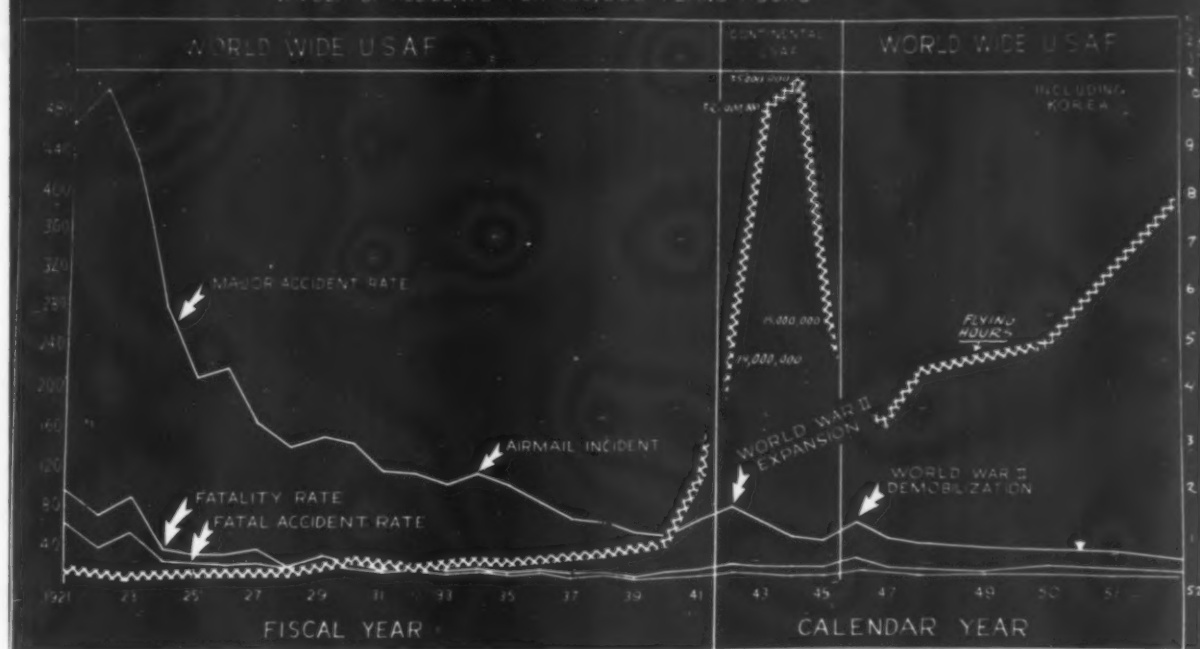
An important decrease in crash rates can be expected with decreases in the number of crew members involved in the operation of the airplane.

This naturally involves only those operations requiring proper timing and sequence for safe results. The ultimate in this respect is, of course, an airplane so designed that all operations effecting safety are handily done by one pilot. A landing gear is never prematurely retracted by a pilot as a result of his nose itching during a take-off, but many DC-3 gears have been so retracted by the co-pilot when he interpreted the pilot's hand going up to scratch his nose or adjust his head phones as a signal for up-gear.

Excluding cockpit chores, such as operation of the air conditioning system, it appears that the more help the pilot has in flying the airplane the greater will be the probability of a crash. The records will support arguments that the expectancy of crashes resulting from flight

RATE TRENDS OF USAF MAJOR ACCIDENTS 1921-1952

NUMBER OF ACCIDENTS PER 100,000 FLYING HOURS



ACCIDENT RATE in military flying is improving, but much remains to be done.

crew deficiencies is considerably increased when, with respect to safety, the management of the airplane requires the assistance of a flight engineer or third crew member.

Many crashes could have been avoided if the designer had been required to design such things as control cable systems, air speed and altimeter pressure systems, electrical trunk terminals and the like in such a manner that would preclude their inadvertent unsafe assembly. Typical of these avoidable losses were the fatal crashes of a DC-4 due to reversed elevator trim tab cables, a DC-6 due to reversed aileron cables, and a Constellation due to reversed air-speed-altimeter alternate source pressure lines. To prevent losses of this sort on future designs requires only that we rule out their inherent design failings.

As an interested observer, I am quite confused by the designers' treatment of the problem of aircraft fires. Dividing it into three parts we have the installation and arrangement of those things responsible for the fire, the means of its detection and the means of its control and tolerance. It appears that a great deal more attention is given to detection and control than is given to origin and cause. Perhaps we should occasionally ponder over what we consider an acceptable cause exposure.

For example, in a modern transport we can find within a radius of two or

three feet the open exhaust flame from a 2,000 hp engine, gasoline flowing through lines and fittings at 30 pounds pressure, almost white hot exhaust pipes, highly inflammable hydraulic fluid under 3,000 pounds pressure, and a lot of high amperage electronics. Immediately behind this and in the wake of the exhaust flames is the wing, within which are tons of high test gasoline, the same high pressure flow lines, more electrical gimmicks and a roaring fire in a combustion heater or two.

Pounce on Passengers

All this we accept with a perfectly straight face and then in great righteousness we pounce on a passenger like he was some sort of a criminal just because he doesn't get his cigarette snuffed out the instant that the "no smoking" sign is illuminated. I don't know who is supposed to be impressed by our determined use of that sign, but I do know that the record labels it as just one more possible cause of a serious fire. I think it is almost amusing that a short circuit in the "no-smoking" sign of a Constellation caused a serious fire and major damage to the airplane.

I submit that the unfortunate results of aircraft fires can be substantially lessened if, in our original design concept, we will use a little more old fashioned conservatism and place a little less dependence on our ability to detect and extinguish the fires that might occur.

Reductions in fire risk can be achieved by such simple and obvious expedients as the use of the fire resistant hydraulic fluid and minimum necessary pressures in the tank to engine fuel lines. A dependable way to avoid fire following a crash is to remove the fuel from the scene of the accident which, in the case of survivable crashes, can be effectively accomplished by the use of external fuel tanks, so mounted that they will be flung clear when the airplane is suddenly decelerated at a fairly high rate.

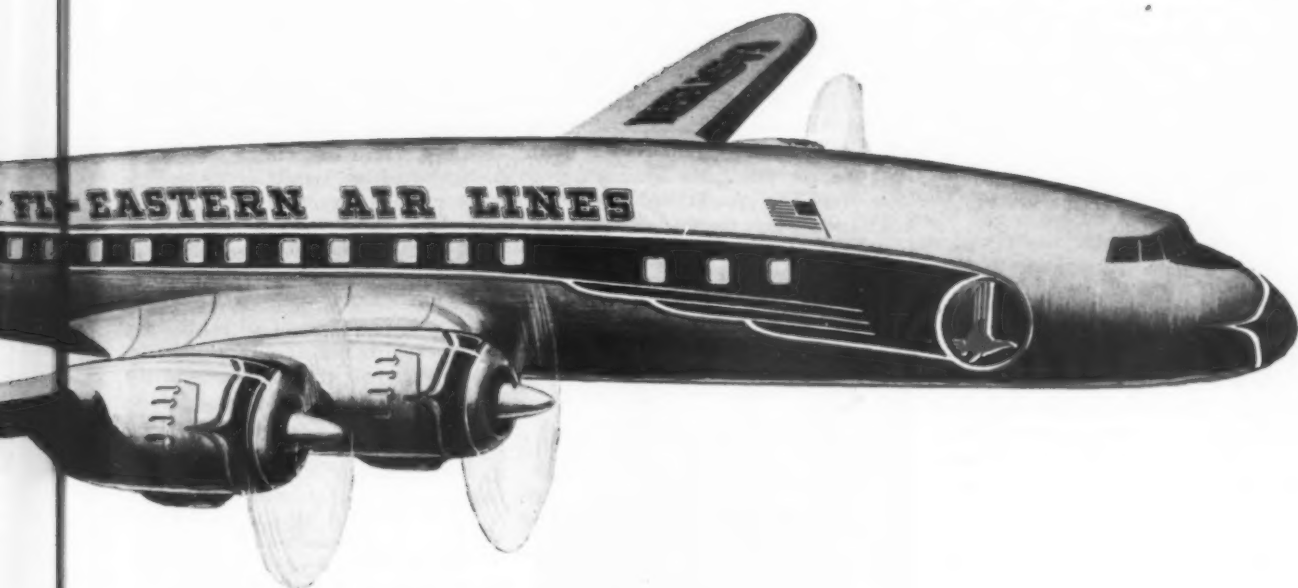
I think that the ends to which we seem willing to go to make crashes survivable are entirely disproportionate to the steps we take to prevent the crashes from occurring in the first place. For example, one operator has voluntarily reduced the earning capacity of a number of his airplanes over a quarter of a million dollars a year apiece in order to improve the passengers chance of survival. The gain is made by reducing the number of passengers to be evacuated in the event of fire following a minor crash.

Here it might be said that the consequences of the fire will be reduced by the proportional reduction in passengers aboard, say 20%. For a small percentage of the cost of this 20% reduction in consequences he could essentially eliminate all consequences by preventing the occurrence of a serious fire, and for still less he could reduce the

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probability of the crash itself by some 75%.

Our attitude toward survival is much like our attitude toward aircraft fires: our best talents and efforts, it seems, are directed at minimizing the consequences of our misfortunes rather than at preventing their occurrence.

Our responsibility for protecting the non-participating public should be a potent influence in establishing priority for our various safety improvement efforts. Obviously, survival is not even related to the prevention of a crash, and to divert to it any effort or expenditure that could beneficially be used in reducing crash expectancy is to expose both participants and nonparticipants to unnecessary crashes in order to reduce the pain of a few of the crashes to a fraction of one group.

Unique Position

With respect to the safety of the general public we should always be mindful of the unique position of aviation as it compares to other sources of similar peril. Generally speaking, one must be either a participant, a trespasser, or willingly exposed before suffering from the misfortunes of marine travel, railroading, or automotive traffic.

Since even the sanctity of their own homes will not provide protection against the consequences of our misfortunes, it stands that the survival of the nonparticipating public should rate equal if not greater attention than the survival of our electively participating passengers. I submit that if we reduce our crash rates only to the lowest limits of economic advantage, we will assure much greater safety for the public and guarantee not only maximum chance for survival of our passengers, but minimum chance of injuries as well.

Change in Attitude

We must change our whole attitude toward flight safety if worthwhile reductions in crash rates are to be expected.

Our regulatory agencies must change their psychology. They should more objectively examine the proportioning of their time between the legal technicalities and the lethal actualities involved in aircraft crashes. At present they are much more concerned over whether or not a safe flight is possible than they are over whether or not it is probable. They make a great deal more fuss over the effects of humidity on a take-off than they do over the effects of locked controls, more to-do over the take-off flight path with flaps in take-off position than in the position they

are in during take-off, over legal aspects than lethal aspects of a flight!

We should re-examine our concepts which now allow us to consider as acceptable an airplane which we feel is so likely to end up in a crash that our conscience forces us into having the passengers turn their backs on what is expected to happen.

We must look down the road we are traveling and consider what is ahead. Already we are asking our pilots to fly airplanes with such high wing and power loadings that we have had to open a gate on the end of the runway and let them out of the airport like an old cow being let out to pasture, and now we are practically blasting them loose from the ground with JATO. I don't know where the road ends, but the records show that it is a toll road with an ever increasing fee, and one we cannot



BEN O. HOWARD, veteran pilot, engineer, and aviation consultant, prepared this paper for presentation before the Institute of the Aeronautical Sciences' annual meeting in New York late in January, but it was found "unacceptable," presumably because of the provocative nature of its charges. AMERICAN AVIATION presents it here in its entirety, except for supplementary background material which Howard used to substantiate his statements.

Howard, 49, has had a long and varied career as a pilot, ranging from crop dusting to flying airmail, racing, and test piloting. He designed and built racing planes, and won the Bendix Transcontinental Race trophy in 1935.

Prior to becoming a consultant, Howard served as general manager of the aircraft division of Fairchild Engine & Airplane Co., director and consultant for Consolidated Vultee Aircraft Corp., and assistant to the president of Douglas Aircraft Co. He operated his own aircraft manufacturing company before the second World War.

not afford to travel unless we do everything possible to hold down the tariff.

The yardstick we have been using for measuring safety is almost useless as an equator of the actual risks involved in flying. It has encouraged the complacency which has allowed the risks of a given flight to increase 500% while we were complimenting ourselves on the excellence of our new designs and handing out awards for achievements in safety that are measured by a rule that does not reflect our achievements.

An objective analysis of typical crash causes indicates that the accident expectancy per mile is essentially inversely proportional to the length of the flight. By taking benefit of the greater range performance of our newer equipment, in the form of longer average flight lengths, proportional reductions in crash expectancy per mile can be attained.

Nearly one third of all crashes can be prevented by simple mechanical safeguards that will effectively prevent the crew from making errors such as result from confusion, forgetfulness and improper sequence. With the current amount of American military and civil flying being done this could result in the saving of over 500 lives and the loss of hundreds of airplanes annually.

Other substantial reductions in crash rates can be caused by more objective control of design, flight operations and crew requirements. Increasing the chance of surviving a crash should rate lowest priority in our efforts to increase safety, since it is not related to the prevention of aircraft crashes.

The prime requisite for greater safety is a willingness to do those things that our records clearly establish as being an effective means of preventing the various types of crashes . . .

I hope I have included something which is thought provoking enough to be just that. Something provocative enough to cause a little thinking of the hundreds of air line passengers whose last confidence was placed in us, and of the thousands of young men in our air arms who were allowed to die this side of the enemy because we just didn't get around to doing what it takes to prevent such things.

I also hope that I have included nothing that has proven offensive. If I have I assure you that it was presented with good intent, and hopefully directed at a possible reduction in this ultimate of all offenses—the unjustified taking of human lives. I submit that we are guilty of having already allowed thousands of such offenses to be committed and it is damned high time we put a stop to it!

• • •

AMERICAN AVIATION

Off-Shore Building Begins to Roll

PARIS—The Mutual Security Agency's off-shore procurement program, which has been revised and re-revised during the past few months, is now reaching the point where some airplanes will actually be built. Until now it has largely been a conversation program.

The program, which is designed to build up the productiveness of the European nations as an additional source of aircraft supply in case of emergency, will still consist of three interceptor-type aircraft, but only one of the three originally planned remains in the program. The U.S. is putting up \$225 million out of a total program of \$400 million for production of the three types.

Although the program has been in the conversation stage for nine months, no firm contract has yet been signed, despite reports to the contrary. A lot of the difficulty arose from the fact that the original program was set up before technical evaluation teams arrived in Europe to look over the planes and the facilities for producing them.

The three planes which were to have been built originally were the Dassault Mystere, the Vickers-Supermarine Swift, and the de Havilland Venom, the latter an all-weather fighter.

The French company Avions Marcel Dassault was to build its own plane, the Mystere, while another French company, SNECMA, was to build its Atar engine. The Swift was to be built both in England and in the Netherlands, with Fokker Aircraft Co. handling the airframe assignment and the Belgian company Fabrique National building the engine. The Venom was to be built in Italy, with Fiat handling both the airframe and engine production.

Plans Changed

But the arrival of evaluation teams in Europe in September changed all that. Now only the Mystere remains in the program. However, although the types have changed, the companies in the program have not; they will still participate in the program, although what they will build is somewhat up in the air at the moment.

As we write this, negotiators are closeted in Paris firming up the Mystere program and a contract should be forthcoming in the near future. The plan is to build the Mystere IV, an advanced model of the plane powered by the Atar engine, with Dassault and SNECMA handling their original assignments.

However, even in the Mystere portion of the program there have been some modifications to the original plan. First, it appears that the Atar engine will not be ready in time, so initial models of the Mystere IV will probably be powered by the Rolls-Royce Tay. Second, although the evaluation teams are not all impressed by the Mystere II, earlier model of the French interceptor, it may be necessary to start out with production of this model in order to give Dassault a chance to get production lines rolling.

The second day interceptor will probably be the Hawker Hunter, as it appears now. The evaluation teams found a few bugs in the Swift. The plane will be built in England and also by the Dutch-Belgian combine, Fokker building the airframe and Fabrique National the engine.

It is the third airplane type which is causing the most trouble. Here there is a possibility that an American airplane may find its way into the program, although the original plan was to concentrate on European types only. The evaluation teams found that the Venom did not have the required performance for an airplane which would probably not be in service until 1955. Then they turned to the delta-wing British Gloster Javelin, but apparently found a few things they didn't like about it.

American Plane

This practically exhausts the number of European all-weather types and MSA officials are now considering the possibility of putting an American plane in production in Europe. Such a proposal may run into trouble with the U.S. Air Force, which has been reluctant to permit foreign production of its new types. The plane would probably be either the North American F-86D or the Lockheed F-94C, since MSA officials want a plane that is already in production, to simplify the problems of the Italian manufacturer in getting started.

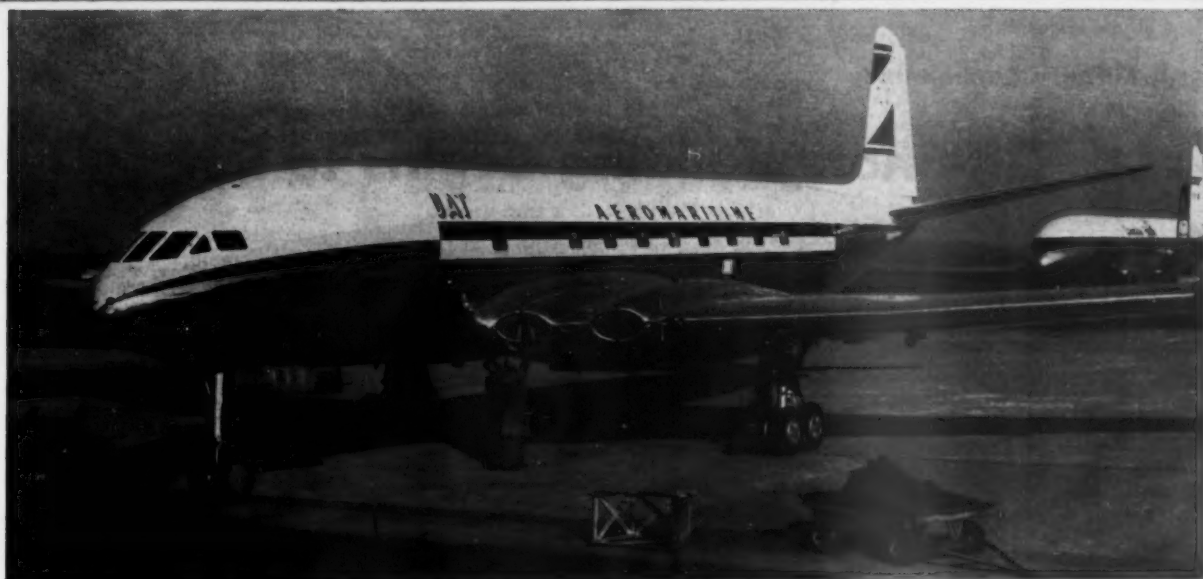
The program may run into more delay in the matter of getting licenses straightened out. Fiat had a license to build the Venom but it has none to build the new plane, whichever one it might be. The same is true of the Dutch-Belgian combine.

But MSA officials hope the licensing arrangements can be completed speedily, for time is now the most important element. In passing the money for off-shore procurement of complete aircraft, Congress stipulated that the program was to be completed not later than July 1, 1955.

This gives MSA only a little more than two years to get the contract negotiations out of the way and all the airplanes built and paid for. Some officials privately admit that it cannot be done, but they think they have found a way around the problem. Just what the way is they are not saying.

There are also going to be fewer airplanes in the final program than were originally planned. Although the money has not been increased, the assignment of a new, more complex type of all-weather fighter to the program in place of the comparatively low-cost Venom will result in fewer planes for the money allocated. Unless, of course, Congress chooses to up the off-shore ante. MSA officials here do not know anything about that possibility, but it appears unlikely in view of the determination to reduce military spending.

... JAMES J. HAGGERTY, JR.



UNION AEROMARITIME DE TRANSPORT has received its second Comet 1A and will soon extend its Paris-Casablanca-Dakar jetliner service to Abidjan. The company has been designated the French flag carrier for Paris-Johannesburg route.

Europe's Independents Spread Their Wings

New routes, new equipment brighten the picture for independents who survived postwar problems.

By ANTHONY VANDYK

THE EUROPEAN independent airlines are in the news: a British operator has been authorized to start scheduled trans-Atlantic service this summer; a French company last month became the world's second airline to operate de Havilland Comet jetliners; another French firm will take delivery of a fleet of new Douglas DC-6B's this spring; and the French government has designated an independent instead of Air France as the French flag carrier on the Paris-Johannesburg route.

What does all this mean? It means that the European independents are at last well on their way to becoming full-fledged international carriers.

An indication that the carriers are convinced that the future has become brighter is the recent trend toward joining the International Air Transport Association. Nevertheless for the independents the word "brighter" in relation to the future is strictly relative. The postwar years were nightmares for the independent companies, years of frustration and discouragement in which only the financially fit survived. Many foundered and several survived only by selling out to shipping interests (today all

but one of the major French independents are controlled in varying degrees by shipping companies).

In view of the past attitude of the British and French governments it is perhaps surprising that the independents are still in business as scheduled carriers. In point of fact they are operating several intercontinental routes, notably to Indo-China and to Africa. From Paris to Saigon, for instance, four of the nine weekly services are flown by independent companies. On the route from Paris to the African boom town of Abidjan the role of the independents is ever more important: only two of the five weekly services are flown by Air France.

No Favor

A student of schedules might deduce that, because of the high proportion of French routes flown by the independents, these companies enjoy the favor of the French government. Discussion with the managements of these enterprises would show such a deduction to be incorrect. Examination of the permit for each route would show it to be either of short term or else valid for no particular period of time and subject to cancellation virtually without notice.

Although the French independents have a number of modern aircraft on order in the U. S. and Britain this does not mean that the companies are encouraged to place such orders by the government. Authorizations are required before the order can be placed and more authorizations are needed before the requisite foreign currency for payment is made available by the government. Those authorizations that have been granted to date have been granted grudgingly. Many requests have been refused. Others are gathering dust in some official's pending trays.

One reason for the French government's reluctance to let the French independents acquire modern aircraft from abroad is the existence of France's own aircraft industry.

Although Air France is allowed to ignore most of the products of the French aircraft industry, several of the independents have had to buy French or not buy at all. One company which wanted Convair 240's had to take SNCA du Sud Ouest SO 30 Bretagne's in order to operate pressurized equipment. The availability of the Strato-cruiser-sized SNCA du Sud Est SE 2010 Armagnacs has also deterred the French government from granting authorizations for the acquisition of large foreign transports. A full account of the French independents' equipment program was given in *AMERICAN AVIATION* on July 7, 1952.



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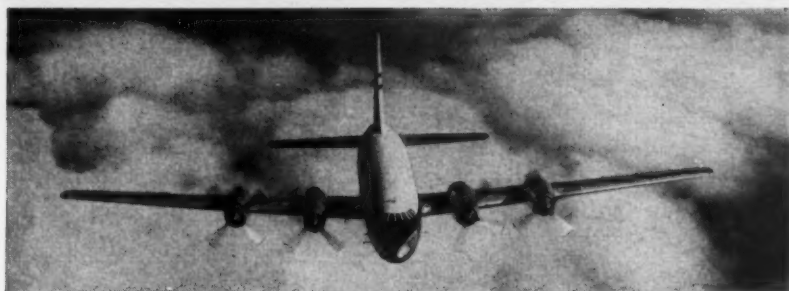
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AIRWORK LTD. is planning to order Bristol Britannias for its all-cargo services. In addition to trans-Atlantic operations, company plans all-cargo services from London to Persian Gulf and Aden.

In Britain equipment problems have plagued the independent air transport industry even more than in France. While the French companies were able to obtain Douglas DC-4's as their main long-haul equipment, their British counterparts had to rely on converted bombers or aircraft derived from them; no dollars were available for U.S. equipment and the British aircraft industry had little to offer.

York Still Mainstay

The Avro York is still the mainstay of the British independents for inter-continental flights, despite its poor economics and inadequate performance. The twin-engine Vickers Viking and Douglas DC-3 are the predominate aircraft in the medium-range class. Airwork Ltd. and Hunting Air Transport both use Vikings for their scheduled coach services to Central Africa. The Bristol 170 is the main fleet unit of Silver City Airways, a company specializing in car ferry and freight operations. Flying boats are operated by Aquila Airways on services from England to the Atlantic island of Madeira.

The hesitancy shown by the British independents in ordering modern equipment such as the Britannia, Comet, and Viscount is partly due to lack of money. It has been suggested that the government, which already finances BEA's and BOAC's procurement programs at low borrowing rates, will have to do the same for the independents, not because the latter require subsidy but because, as a transport reserve for defense purposes, the government will find this far less expensive than building up the Royal Air Force's depleted Transport Command.

In recent years the British government has given extensive contracts to the independents—they carried over 55,000 military personnel in the year ended March 31, 1952. Moreover, the Berlin air lift pointed up the military value of the independents—in 13 months they

carried 150,000 tons of supplies on this operation. The French, too, realize the military value of the independents and are using their services for transport work in support of the operations in Indo-China.

Some observers feel that lack of money is not the real reason why the British companies are refraining from ordering new equipment. They point to the considerable resources of the Hunting group of companies and to the extensive financial connections of Whitehall Securities Ltd. which stands behind Airwork Ltd. These observers think that uncertainty about the future is the real factor delaying the placing of orders.

Even though the present Conservative government has promised that for all new scheduled passenger and cargo services the independents are to have the same opportunities as BEA and

Airwork's Equipment

Airwork Ltd., which has been given a 10-year British license to operate scheduled all-cargo services from London to Montreal and New York, is a 25-year-old company with operations covering almost every aviation activity except aircraft manufacture. Its *Air Transport Division* operates three four-engine Handley Page Hermes, 11 Vickers Vikings, and two Douglas DC-3's; its *Overseas Division* operates 25 twin-engine transports. Over 300 aircraft are operated from seven airfields by Airwork's *Schools Division*, whereas the *Repair and Servicing Division* overhauls and maintains all Airwork's aircraft and also performs overhaul and repair work for the British government, Handley Page Ltd., Vickers Armstrongs Ltd., and Canadair Ltd.

BOAC, it has still not been made clear to what extent they will be able to take advantage of these opportunities. So far very few of the hundreds of new routes sought by the independents have been approved. Many of the projected services are short-haul runs, of a seasonal nature and unlikely to be profitable; short-haul routes in Europe are rarely money-makers unless they obviate a boat journey for the passenger.

Future Brighter

The major independents associate their future with long-haul routes and the granting of a 10-year permit to Airwork Ltd. for all-cargo service to New York and Montreal has come as a tonic to the whole industry even though two other independents—Hunting and Scottish—had applied to fly similar services.

Immediately after Airwork's license was announced, the company's two top executives rushed to North America to start preparations for service. The application to the Civil Aeronautics Board for a foreign air carrier permit is being drafted and Airwork says it will use "the best possible" equipment until it can get modern British aircraft (it is very interested in the Bristol Britannia). A significant point in this connection is Airwork's interest in obtaining U.S. capital. A director of the company has indicated that American participation as a minority interest (15% to 20%) would be welcomed.

Airwork's decision not to use Avro Yorks or Tudors, as it originally planned to do, is significant in view of the loss last month of a York belonging to Lancashire Aircraft Corporation (flying under the name of Skyways of London), the largest independent operator of four-engine equipment, while on the Azores-Gander leg of a military charter flight from England to Jamaica.

Repercussions

This accident resulted in questions being asked in parliament about the aircraft's suitability for trans-Atlantic flying. It was also revealed that BOAC had advised the independent against operating Yorks across the Atlantic. The disaster caused observers to recall that the worst commercial transport accident ever involved a Tudor of a British independent.

Nevertheless, it must be remembered that the independents have hitherto been largely victims of circumstances over which they have had little or no control. The present widening horizons, bringing prospects of new routes and new equipment, will undoubtedly bring heightened stature to the European independent operators.

Extra Section

By William D. Perreault



ELSEWHERE in this issue (page 32) appears one of the most informative and provocative messages on air safety we have ever read. It was prepared by Ben O. Howard, an outstanding pilot/engineer with roots deep in all phases of aircraft operation and design, for presentation at the annual meeting of The Institute of the Aeronautical Sciences in New York earlier this year. Although Howard was officially on the IAS program, his speech was cancelled by IAS prior to delivery. As a member of IAS I am ashamed of the ostrich-like attitude which prompted this action. Whether or not we agree with Howard's conclusions, he is an authority on the subject, he is an industry figure, and he provides factual data on the background of his statistics. Aviation, in our opinion, is best served when facts are made available to it.

The whole problem of pricing new type aircraft, whether jets, turboprops, local service planes, or what have you, is simply stated in Douglas Aircraft Company's "DC-6A Airfreight Study." Douglas notes that the 17 DC-6A's on order by airlines would cost \$2,660,000 each if design and development costs had to be distributed over these planes. The cost would represent \$52 per pound and depreciated over a seven-year period the plane would have a direct operating cost of 8.20¢ per ton-mile. Spreading development costs over 200 passenger aircraft has made it possible to keep the price down to approximately \$1,100,000, providing DOC of 5.80¢ per ton-mile.

At Bremen, Germany, we noted an electric baggage and utility truck that seemed amazingly easy to operate and use for ramp service. It was fast and quiet. The operator stood on a platform at the end of the truck and could face either backward or forward and operate the truck either way. Ramps leading from the field to the terminal made it possible to run baggage trucks right into the building and to the counters. Most of the airport trucks we've seen have been the noisy type, and certainly not suitable for wheeling into the ticket counter.

At Republic Aviation we found an interesting chart on the cost of compressed air, particularly air lost through leaks and careless handling. Most of us think of air as costing next to nothing and air leaks as of little significance. Republic notes that 45,500 cubic feet of compressed air represents \$2.73, 182,300 cubic feet represents \$10.94, 740,200 cubic feet costs \$44.41, and 920,800 cubic feet costs \$175.25. And that cubic footage really adds up quickly.

Noting recent releases regarding single-axis "automatic pilots," Lear, Inc.'s founder Bill Lear, who won the Collier Trophy for his lightweight autopilot accomplishments, warns: "Nothing is wrong with the single-axis autopilot if it is used to eliminate the necessity of manually flying that particular axis and not considered as a complete autopilot to fly the whole aircraft. The danger lies in the implication that it is an autopilot; the emphasis should be on a single-axis and definitely not an autopilot. As a matter of fact, the word 'autopilot' ought never to be used in connection with such a device."

As if the air traffic control problem wasn't complicated enough already, pilots approaching Chicago's Midway Airport found a new source of air space interference. It seems that Chicago's kiddies were taking advantage of a good breezy day and a fine rooftop location to fly kites. Only real problem was that the rooftop, at the corner of 62nd and Linder Streets, was located at the end of Midway's southwest runway. By the time pilot complaints were relayed to the control tower, police complaint room, and to the Chicago lawn police squad, all that was found was a single kite floating 200 feet above the building and evidence of sudden departures by the boys.



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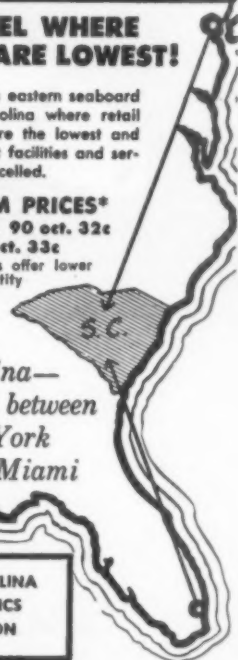
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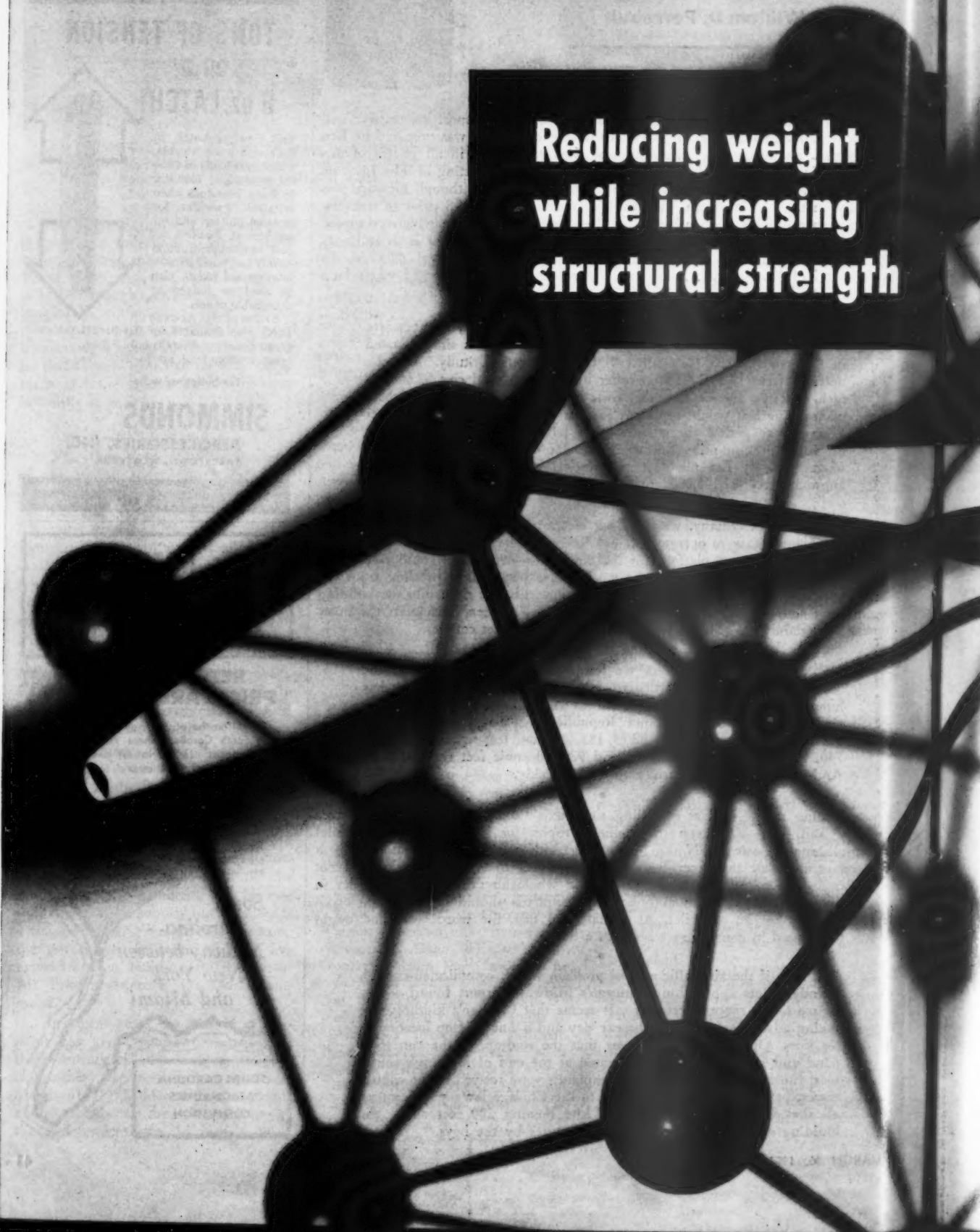
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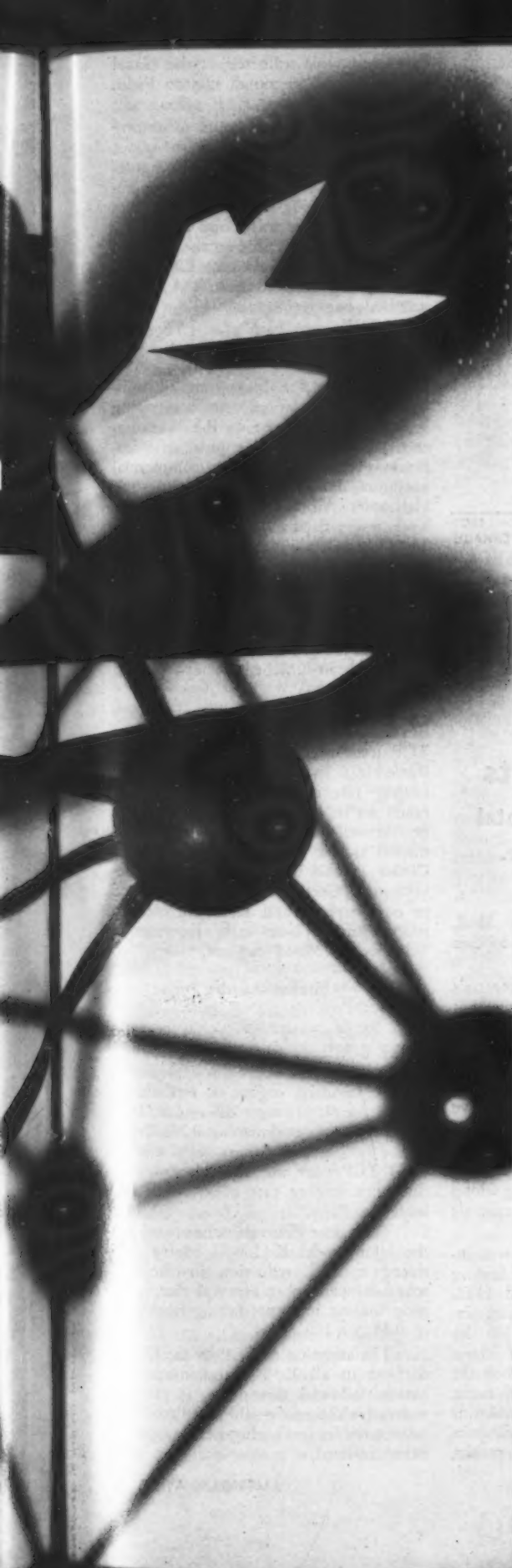
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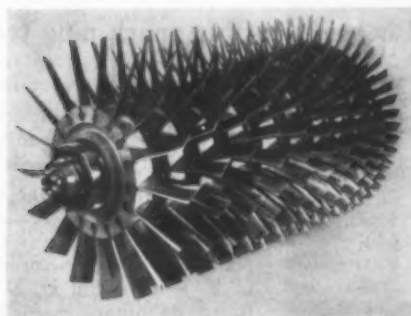
New miracles with alloys are today overcoming one of the greatest problems that ever confronted the aviation industry . . . *ever-increasing plane weight*. As faster and faster speeds were demanded, larger and more powerful engines required, stronger and heavier airplanes became necessary. But Westinghouse engineers had foreseen the difficulties that increases in body and engine weight would bring . . . and their years of metallurgical research and plastic studies had the answers—Titanium and Micarta.

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At the same time that Westinghouse was unfolding the merits of Titanium to the aviation world, their manufacture of Micarta plane parts was proving almost equally valuable in reducing weight, while increasing structural strength. Research on this "lighter-than-aluminum" material and on its further use, other than items such as pulleys, cams, structural members and assemblies, continues without a stop.

Reducing weight and increasing structural strength with these new materials are but two of the hundreds of aviation developments under way in Westinghouse plants and laboratories the country over. Every day some new product, engine or material from one of the plants is announced . . . some new record is set . . . some new goal achieved. Every day more and more eyes are turning to the name Westinghouse for promise of tomorrow's faster, safer, more economical air transportation. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

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Use of Titanium in jet engine compressors like this, allows reduction in weight while increasing the structural strength.

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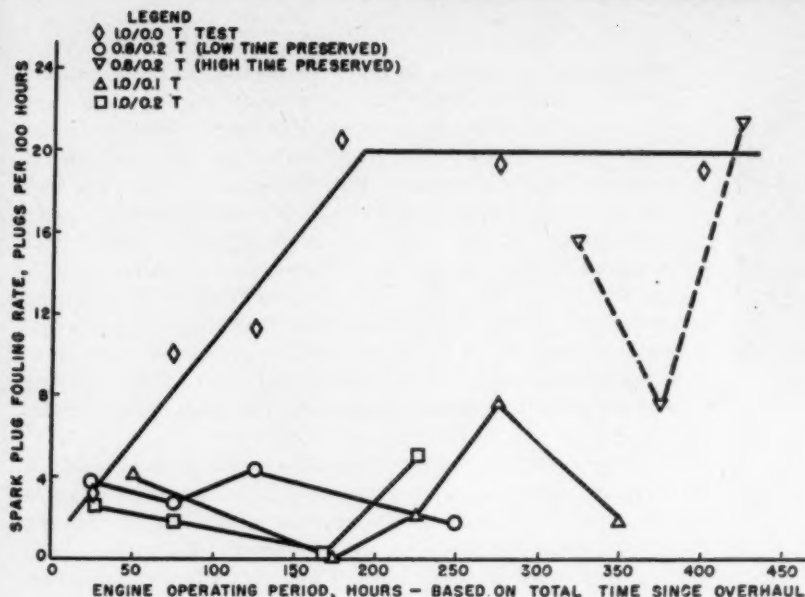
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NAVY HELICOPTER TEST RESULTS plotted here led to general adoption of TCP. Each point represents average fouling rate for all aircraft within the indicated time period. Legend explains various TCP compositions tested compared with regular fuel, which is designated as 1.0/0.0. Other designations reflect the theories of ethylene dibromide (EDB) to those of tricresyl phosphate (TCP).

TCP Makes Good in Latest Field Tests

Additive has worked its way out of experimental stage; tests show it helps in cutting spark plug trouble.

By JOSEPH S. MURPHY

SHELL Oil Company's TCP fuel additive has come a long way since the period early in 1951 when it emerged from the laboratory for its first operational testing. It has survived the temporary setback of an unsuccessful venture on Northwest Airlines' fleet of Boeing 377 Stratocruisers and today stands on the threshold of gaining even greater favor both in military and commercial circles. These recent developments point up this trend:

- **Potential** of an aviation gasoline price hike should bring renewed attraction to TCP's ability to control spark plug fouling under "fuel economy" practices of extreme manual leaning.

- **New evidence** of its value in combatting other engine problems has come to light. American Airlines' engineers are now documenting TCP's part in reducing spark plug troubles under take-off power conditions.

- **Solution** for the exhaust system contamination experienced at Northwest,

a study nearing completion by Shell, may open the door for military adoption of TCP in its fuel specification.

But disregarding the new potentials in the making, the record shows that TCP has earned its way out of the experimental stage. According to Shell's C. R. Johnson and D. N. Harris, who traced its history recently in a paper given before the Society of Automotive Engineers, the past two years of testing have brought these results:

- **In Bell HTL helicopters**—an 85% reduction in spark plug fouling along with an 83% cut in spark plug removals for all causes.

Early in 1951 when TCP was introduced by Shell, spark plug fouling troubles were plaguing the Bell HTL helicopter, powered by a Franklin six-cylinder, vertically mounted, 200 hp engine. The Navy Bureau of Aeronautics, eager for a cure, undertook the evaluation of TCP on this equipment, first on a limited basis at the Marine Corps Air Station, Quantico, Virginia, where there were encouraging results,

then on a wide scale test at the Naval Air Training Compound, Ellyson Field, Florida.

After some 1,760 hours of testing TCP engines, compared with about 1,650 hours accumulated on engines using regular fuel, the number of premature spark plug removals on engines using the additive was found to be only one-half that experienced on the standard engines. The removals traced to spark plug fouling dropped from 154 on the standard engines to only 63 on those using TCP.

Plugs Used Longer

Following the Navy test all military services adopted the scavenging agent for general use in the operation of the Franklin O-335 engine. Also impressed by the test results, commercial operators of the helicopter, Chicago's Helicopter Air Service, and the New York police department put it into use. They report no unscheduled spark plug removals for the six months it has been in service, while the spark plug removal time is being upped from 25 to 50 hours.

- **In the USAF Convair B-36**—an 89% drop in unscheduled spark plug changes.

At the same time that the Navy Bureau of Aeronautics was beginning its TCP tests on helicopters, the U.S. Air Force was living with a spark plug fouling rate as high as 1.41 per 100 hours on its \$3.5-million B-36 bombers at Carswell Air Force base. Tests conducted by the Wright Air Development Center of the USAF Research & Development Command were first limited to one airplane and later extended to four B-36F airplanes using six Pratt & Whitney R-4360-53 engines.

Similar Results

Here the results closely resembled those obtained by the BuAer. In the earlier B-36 tests where a plug fouling rate of 7.2 per 100 hours was experienced on the standard engine, a formula of 0.8/0.2 ethylene dibromide/TCP brought the rate down to 0.73. Trials with a concentration of 1.0/0.1 EDB/TCP were not as successful, producing a fouling rate of 2.43 per 100 hours.

This same formula when used on the later model R-4360-53 engine produced a 75% reduction in the off-schedule spark plug removal rate, with plug fouling incidents falling from 1.41 to 0.36 per 100 hours.

The adoption of TCP by the USAF for use in all B-36 operations, which closely followed these tests, is proving a worthwhile move—the predicted improvement in spark plug performance is being realized.

Helicopter results brought added Navy testing, this time in fighter aircraft, using the Grumman F8F of the Naval Air Advance Training Command. The Pratt & Whitney R-2800-34W engines used in the F8F with regular fuel had an unscheduled spark plug removal rate of 26.0 per 100 hours.

- **Use of TCP brought a reduction** in the order of 87% using a 0.8/0.2 EDB/TCP formula and a drop of 43% with a 1.0/0.1 theory of the additive.

- **Aircraft availability increased 20%** when TCP was used, the result of reduced line maintenance required to correct rough engines.

These successes, which involved only four aircraft, brought expanded activity, with the test extended to all Navy training airplanes in the Corpus Christi, Tex., area. Still in progress, it is being closely watched by the Navy and Shell.

Joint civil-military testing in Canada followed. The airplanes selected were Trans-Canada Airlines' DC-4M's powered by Rolls-Royce Merlin engines. Under particular study here is the effect of TCP on lubricating oil where oil dilution is used regularly (at each engine shutdown on the DC-4M). After 150 hours of testing with a 1.0/0.1 TCP mix, only one spark plug removal incident had been experienced. And the TCP build-up in the oil to date closely follows that experienced in other tests.

Late in 1951, the first commercial testing of TCP got under way when American Airlines began an evaluation on two Douglas DC-6 coach airplanes with P&W R-2800 engines, two engines on each airplane being supplied with regular fuel and two with a 1.0/0.2 theory of TCP. Progress was hampered by premature engine removals not related to the test, but a reduction in both the unscheduled spark plug and cylinder removal rates gave promise, leading to a more extensive trial on all of AA's coach airplanes which got under way in September, 1952, and is now nearing completion.

During the initial tests by American, one airplane was fitted with a Bendix ignition analyzer and spark plug malfunctioning under take-off power was observed.

But the degree of malfunction on test engines using TCP was only 1/3 that of the engines using regular fuel. More extensive testing pin-pointing the effect of TCP was recently completed by American.

In the second phase of testing at American, eight coach airplanes were used and the TCP theory changed to 1.0/0.1. In the interim between the two tests, AA had also made significant changes in its engine operating procedure. Climb powers were reduced 50

to 100 brake horsepower with rpm changes. Cruise rpm was changed. The colder Champion R-33 spark plug was adopted in the front cylinder row, rear spark plug position.

After 14,000 hours of a potential 44,000-hour test program, TCP engines continued to maintain a 30% reduction in irregular spark plug removals and an "unexplained" 72% lower premature cylinder change rate.

At KLM Royal Dutch Airlines a Convair 240 was tested with TCP. The unscheduled spark plug removal rate for TCP engines went down 60%, dropping from a fleet average of 4.1 per 1,000 engine hours with regular fuel to 1.7 for the test engines. Time accumulated on spark plugs rose from 420 hours for the fleet to 600 hours using TCP, leading KLM to extend the test to one-half of its 12-airplane Convair fleet.

But in other trials, the Shell additive has been less successful.

- **Northwest Airlines** dropped its fleetwide use of TCP on Boeing 377 Stratocruisers after two weeks of operation. Immediate investigation showed excessive exhaust system deposits had brought a significant reduction in turbo efficiency. Shell's laboratory program to solve the problem, active since the test was suspended, is understood to be nearing conclusion.

- **Trans World Airlines'** test on half its coach fleet of 049 Constellations showed an increase in the premature cylinder change rate and spark plug removal rate on the TCP engines, although "engineering evaluation" of the results cut the spark plug rate from 1.4/1000 hours with standard fuel to 0.7/1000 hours with TCP.

- **British Overseas Airways Corp.** experiment on the Argonaut was abandoned after 70 hours. The exhaust collector box on the blend side manifold had burned through, a condition later traced to increased deposits in the exhaust system of the engines using TCP.

With the tests continuing, the Shell experts took time out to draw these tentative conclusions:

- **All factors considered**, the best TCP composition appears to be 1.0/0.1 EDB/TCP.

- **Reduced spark plug fouling** can be had using TCP in certain airplane/engine combinations, but it cannot be used indiscriminately in all airplanes with exhaust turbos. The deposit problem must first be solved.

In any event, TCP has been adopted by the military for standard use in specific model aircraft. The military wants a standard fuel for all its equipment. Solution of the turbo deposit problem will clear the way to that end—the adoption of TCP in the military fuel specification.

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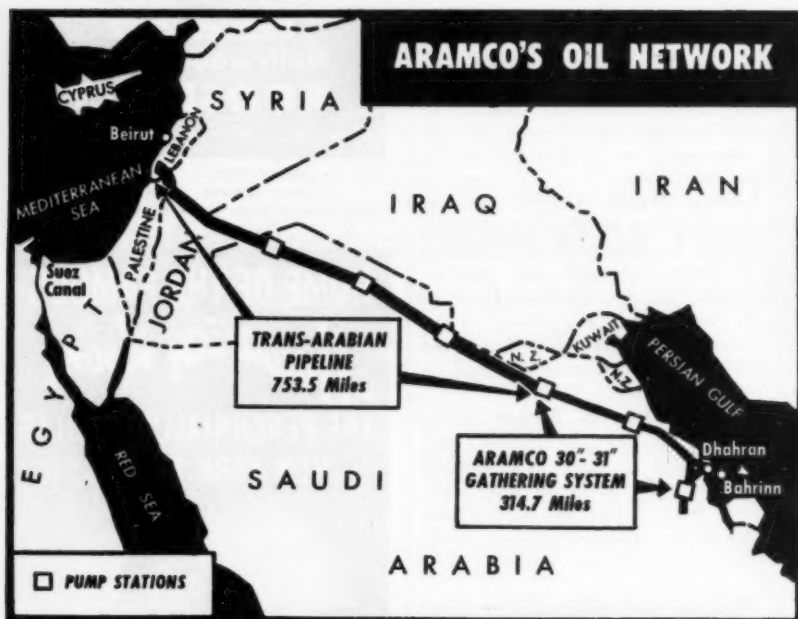
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Aramco's Corporate Fleet ...



...Flies the Arabian Desert

By LOIS C. PHILMUS

DOUGLAS DC-6B equipment, heretofore used exclusively by airlines, is now part of the huge corporate aircraft fleet operated by the Arabian American Oil Company. Two DC-6B's have been put into transatlantic service by the oil company, supplementing the DC-4 which is solely used for overseas operation.

The Aramco DC-6B's carry a maximum of 48-passengers but, to insure maximum passenger comfort, the average load is usually limited to 35-40.

Custom interiors were designed for the particular needs of the oil company's employe passengers. The main cabin seats 34, and two rear compartments can accommodate seven passengers each, with compartment divans convertible to sleeping four. A forward compartment, with sleeping accommodations for three, serves as a rest area for the crew.

The addition of the new Douglas aircraft, one of which went into service in August and the second in late fall, has permitted Aramco to set up what is tantamount to a scheduled transatlantic service from New York to its main head-

quarters in Dhahran, Saudi Arabia. A plane leaves Idlewild Airport every Wednesday and Friday; return flights are on Tuesday and Thursday.

With this operation Aramco is able to handle the transportation for 50% of its employes and families. It is estimated that about 5,000 passengers are carried across the ocean each year by the corporation's planes. Airlines are used when schedules coincide with Aramco's employe needs.

Aramco has found that by operating its own transatlantic services its personnel operation is facilitated. When a man is hired for duty in Saudi Arabia or the Middle East, he must be put on salary at once. If Aramco had to depend on airline schedules completely, weeks and sometimes months could go by before transportation could be found for the new employe. With its own service, the employe can be hired according to the company's own transatlantic schedule and can be on the job within the week.

The aviation department, headed by aviation veteran George Kraigher with headquarters in New York City, consequently works closely with the personnel department.

The job does not end, however, with the transporting of the new employe to his site of duty. After a trial period the employe's family joins him; often as many as 12 children are aboard one of the four-engine planes on a trip.

Also, personnel regulations state that a man must take 80 days leave in the United States after two years of duty in the Middle East. With more than 6,000 Americans employed by Aramco overseas, the transatlantic traffic is heavy each year.

But this is just one segment of Aramco's unique corporation aircraft operation. For travel in Saudi Arabia a fleet of 18 aircraft is available for local operation. Two Convair 340's, seven DC-3's, four Twin Beechcrafts, and five Navions complete the picture. This 21-plane fleet chalked up 40,000,000 passenger-miles and 2,000,000 ton-miles in 1952.

At least half of all the flying operation is conducted on a scheduled basis. Flights are run five times a week between Dhahran and Beirut, with stops made at the Trans-Arabian pipe line stations along the route (see map). Three times a week planes leave for Asmara and daily flights are run between Dhahran and Bahrain. The 340's and DC-3's are used along these routes.



Kraigher

AMERICAN AVIATION

Kraigher directs this entire operation from New York and is assisted by R. F. Morris, his superintendent of operations in Dharan. According to Kraigher, Aramco is not typical of corporation users. Because of the nature of the territory and the lack of transportation in the Middle East, Aramco could not conduct its vast operation without aircraft. Many corporate users in the U.S. have other means of locomotion, but not Aramco.

Its first plane was put into service in the early 1930's—a five-passenger Fairchild—and the operation has been expanding ever since. The most vital function of the aircraft is servicing outlying fields in the desert. About three to four flight-hours per day are devoted to exploration in the desert.

The Navions and Beechcrafts are pressed into service for carrying passengers and cargo to the hundreds of drilling camps throughout the area, where no other transportation exists. The tons of equipment needed for drilling, the vital supplies, and the workers could not be transported on Aramco's scale without the airplane.

Medical Aid

Another important function of the Aramco fleet is the rushing of drilling field casualties to medical aid. When expert medical care is needed at one of the U.S. medical centers, the patients are flown back to New York. There is an average of one to two litter cases in the drilling fields a month. If a charter were available, which it is not, it would cost as much as \$20,000 to \$30,000 to get the injured or sick back to the States for medical treatment.

Because the Arabian peninsula consists of flat gravel plains and desert land, landing strips are easily installed, so airports are no problem to the Aramco operation.

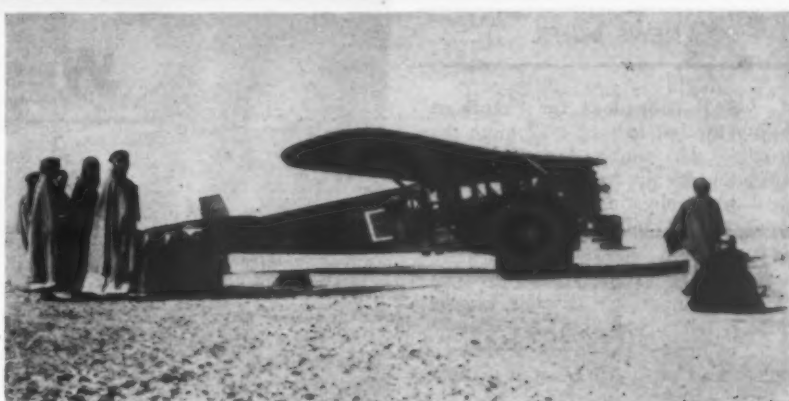
It takes a total of 325 people to run this huge corporate aircraft operation. Of the total, 42 are pilots, about 200 are mechanics, and the balance are stewards, pursers, and administrative workers.

Seven crew members fly on the transatlantic hops, including three pilots (one being a commercial navigator), as well as a radio operator, flight engineer, stewardess, and purser.

Two aeronautical engineers are on the New York staff to provide technical and maintenance advice. They spend one-third of their time in New York.

Of the personnel, 225 are on salary and 100, mainly maintenance and technical workers, work under contract in Dharan.

The three four-engine planes call New York their home base. With Idlewild Airport as headquarters Lockheed



FAR CRY from the early 30's, when Aramco bought its first plane, a five-passenger Fairchild (above) is the equipment the oil company is using today. Below is the complex operations' area of the Douglas DC-6B, two of which are in transatlantic service for Aramco.



International handles all maintenance work on the four-engine equipment. Engine changes and modifications are handled at the source of manufacture. For instance, major engine overhauls, which occur any time from 600 to 1,000 hours, are handled by Pratt & Whitney.

A large maintenance base has been set up at the airport in Dharan. Two large hangars and shops take care of the major portion of the maintenance and repair of the 18-plane fleet based in Arabia. There 140 American mechanics and 80 native technicians take care of the fleet.

Operating standard airline equipment on board the larger aircraft, Aramco follows conventional airline overhaul and maintenance practices pretty closely. The only difference is that engine changes and overhauls take place a little more frequently.

Training in the handling of new equipment by flight crews and ground support personnel is handled by the

manufacturer. When the Douglas DC-6B's were put into service, Douglas representatives were on hand to train all personnel involved. A certain amount of flight training is handled under sub-contract to Trans World Airlines, and Pratt & Whitney provided the training details for maintaining its engines.

Aramco's re-equipment plans for the immediate future call for disposing of three of the five Navions, which will be replaced by small twin-engine aircraft when they are available. ...

State Officials Change

Two changes have been made in the roster of state aviation officials. Robert E. Bomar has been named director of the Tennessee Bureau of Aeronautics, replacing Ralph B. Routon. In Kansas, Glenn Tabor, director of the division of aeronautics of the Kansas Industrial Development Commission, has resigned.

USAF obligations for "hardware" during the last half of 1952 more than matched the combined total of such obligations for the Army and Navy, with the USAF obligating \$9.4 billion, compared to \$4.1 billion for each of the other services.

A program to develop airborne radar is under way at RCA's Camden, N. J., engineering products department, for use by United Air Lines in mapping weather. Equipment should be ready early next summer.

Finland's Valmet O/Y (State Aircraft Plant) is currently building a series of 30 Vihuri two-place advanced trainers for the Finnish Air Force, to replace the Pyry trainers now in service. For reasons of economy the new planes are being equipped with Bristol Mercury engines built under license in Finland during World War II. The Vihuri is an all-metal low-wing monoplane with tandem seats.

A 20-year lease covering construction of the largest overhaul base on the east coast has been signed by Lockheed Air Service-International and the Port of New York Authority. Lease covers a \$2.7 million hangar on a 25-acre base. Completion is expected by the end of this year.

Eastern Air Lines' Martin 40-4's carried 975,000 passengers during their first year of operation, equivalent to EAL's traffic during its first 10 years. Carrier forecasts two million passengers for the 40-4's during '53.

Ninth all-cargo DC-4 has been acquired by Seaboard & Western Airlines for use in its trans-Atlantic fleet. Value of such DC-4's has risen sharply in the last few years. World Associates, a New York sales firm, has sold three of National Airlines' DC-4's for over \$2 million, with one going to Thai Airways for over \$750,000, the other two to Japan Air Lines. Just three years ago World sold a DC-4 for only \$215,000.

Australian National Airways has challenged, in a High Court action, the use by Trans Australia Airlines of DC-6B's chartered from British Commonwealth Pacific Airlines. Damages are claimed, and legal action is being sought to keep TAA from using the aircraft. Australian National may also switch to the Bristol Britannia, having decided not to take up its option on six Vickers Viscounts.



West Coast Talk

By Fred S. Hunter

DOUGLAS-Long Beach anticipates that the Ford Motor Co., which is running a little behind on R-4360 shipping schedules, will have caught up with deliveries of engines for the C-124C by June or July. Meanwhile, Douglas is accumulating a few "gliders" at Long Beach. It has 10 or a dozen planes completed, minus engines. Those scheduled to stay that way more than 35 days are being sprayed with preservative.

"C" type engines go in the C-124C. These come from Ford's aircraft engine division in Chicago where gage shortages, tooling problems, a shortage of skilled manpower, and the usual other problems served to curtail the initial production pace. Latest reports, however, are that Ford is moving ahead fast on assembly of the Globemaster engines following completion of the 150-hour qualification run on the all-division-built model test engine. The C-124C engine is the -63. Ford also has completed the 150-hour model test on the -53, which is to go in Convair's B-36. Coming up is a third version, the -59, for Boeing's C-97. Latter has a single speed supercharger as contrasted with the -63's two-stage supercharger.

North American Aviation is another company estimating its GFP problems will be cleared up by June. Los Angeles International Airport won't look quite the same without 100 to 200 F-86's strung out on the field waiting for something or other, generally engines or, in the case of the F-86D's, electronic equipment.

NEW EL SEGUNDO SPEEDSTER

Donald W. Douglas let a secret out of the bag in talking to the last meeting of the El Segundo division's Management Club. He broke the news that an important new airplane is in the works, the A4D. It's designed to be the jet successor to Douglas El Segundo's famed AD line of single-engine attack planes.

Douglas has had phenomenal success with its AD's. It has delivered hundreds to the Navy, which uses 'em for almost anything you can think of and hangs everything on them except the kitchen sink. The craft's performance record in Korea is outstanding.

Currently El Segundo is in quantity production on two versions, the AD-4 and the AD-5. Former is the standard attack model. The AD-5 is the utility version capable of doing a dozen different jobs. Now a later model, the AD-6, is being slipped into sub-assembly lines to replace the AD-4.

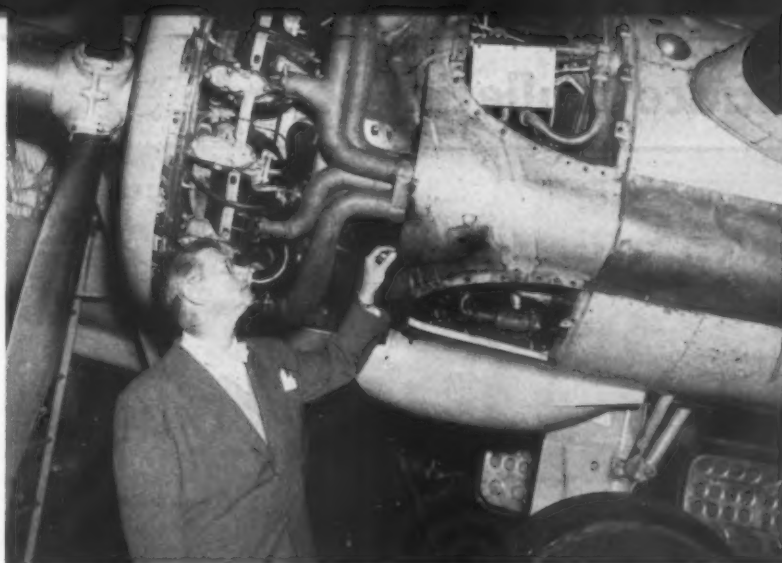
The turboprop A2D is a candidate to succeed the Wright R-3350-powered AD, but whether it makes the grade is much in doubt because of difficulties experienced with the Allison T-40 engine. Latest reports from Muroc, where the prototype is on test, are more encouraging. Flights have been good; gear box troubles have been diminishing. First 10 production models, which the Navy will use for test, are in sub-assembly on a schedule of about one a week. After the Navy gets a chance to give these planes a going-over, a better picture of the A2D's future will be obtainable.

No doubts, however, exist about the A4D's chances of taking over where the AD's leave off. In his talk, President Douglas predicted his company would have important government contracts for at least the next 50 years and he cited the A4D, along with the F3D, the F4D, and the A3D, as the type of airplane that would keep the El Segundo plant going far into the future.

Around town, the A4D is called "Heinemann's Hot Rod"; a most appropriate nickname in view of the fact that it is designed strictly in accordance with the philosophy of the El Segundo division's chief engineer, Ed Heinemann, that too much weight has been finding its way into modern airplanes. The A4D, which will have a Wright J65 Sapphire engine, will be a stripped-down job designed for very high performance, but practically none of the comforts of home.

WEST COAST MISCELLANY

Lockheed's appropriation for employment advertising is \$20,000 a month. . . . Douglas-Long Beach has sent out invitations to bid on a 1,000,000 engineering test building, a two-story \$750,000 electronics building and a \$186,000 jet engine test building. Latter will have double steel walls separated by three feet of sand.



JET EXHAUST COWL with Siamese stacks, being checked by Bill Lear, is chiefly responsible for the increase in speed and range of the Lodestar.

Design Changes Improve "Learstar"

Lear, Inc., will make modifications available to 210 other users of the corporate-type aircraft.

A 25% increase in range and a 32 mph speed increase have been achieved for the Lear, Inc., Lodestar through the design changes developed by William P. Lear, chairman of the board and director of research and development.

Only half way through the modification program the Lodestar flew from Los Angeles to Wichita, Kans., in five hours, three minutes, showing a gas consumption of only 487 gallons of fuel. Cruising speed was clocked at about 230 mph.

Chiefly responsible for the performance gain is the new jet exhaust cowl with Siamese stacks that replaced the old exhaust system which fed into a collector ring. Bill Lear removed the bat-wing configuration, which added a 9.5 mph speed increase without otherwise affecting the plane's performance.

Wing Panels

New wing panels for Lear's executive Lodestar have been approved by CAA and Bill Lear's next step will be to add plastic wing tip tanks with 165 gallon capacity. A substantial decrease in drag is anticipated due to end-plate effect of the tip tanks. The tanks will be attached to the strengthened outer-wing panels in a couple of weeks.

CAA certified the cowling and bat wing removal only for the Learstar, nickname of the corporate aircraft. CAA also has given the nod for the Learstar

to carry the new bayonet-type airspeed pitot mast on the nose.

Bill Lear has designed a new retractable tailwheel which will further improve speed by adding four to six mph to the overall performance of the aircraft.

The augmentor cowl, in addition to improving speed, is said to improve the exhaust back-pressure of the engine, thus increasing its efficiency. The jet exhaust cowl eliminates intensifier tube-type heating.

Lear intends to make these newly designed modifications available to the approximately 210 Lodestar users

throughout the country. Production already has started on the wings and tip tanks.

To complete the modification Lear developed a combustion air-heater system for aircraft which should provide increased heat in winter and better cooling and ventilation in the summer months.

Aero Conversion Engineering Corporation is doing the engineering for CAA certification of all modifications.



SO BIG, says Bill Lear, as he indicates the dimensions of the bat-wing section which he eliminated.



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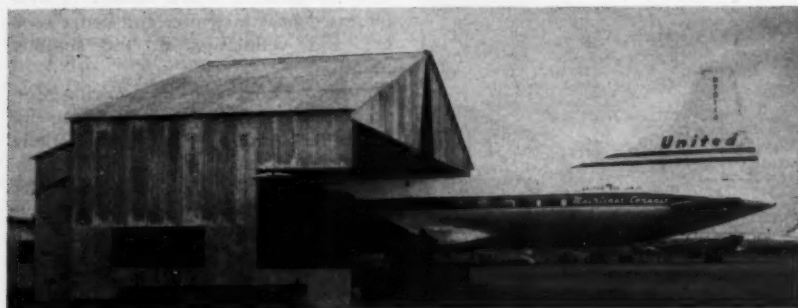
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Maintenance Bulletin Board



New maintenance dock ordered by United Air Lines and American Airlines is mass-produced by the Luria Engineering Co. of New York. Dock measures 70 x 50 feet and features adaptability to all single-, twin- and four-engine airplanes, with 18½ foot eave design permitting entry of the largest transports without lowering antennae. Canvas curtains and sleeves (not shown) provide closure at front and sidewall wing slots.

Access Door Fix Eliminates Buffeting

Capital Airlines has a project under way to solve once and for all the problem of in-flight opening of the hydraulic reservoir servicing door on its Lockheed Constellation airplanes.

Two cases in the past, one of which led to the emergency landing of an Eastern Air Lines airplane on a farm near Richmond, Va., in July, 1951, and another experienced by Capital in which the plane landed without incident were just two too many, to Capital's way of thinking.

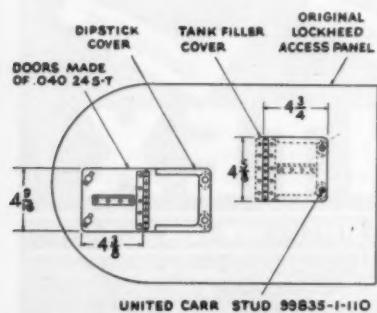
Following the first incident Lockheed recommended installation of a spring arrangement, which would prevent the door from lying flat and attract the crew's attention if not properly fastened after servicing. Another change replaced the "Messerschmidt" type fasteners which were suspected to have been depressed by hail in the in-flight opening on the EAL flight.

The fix worked out by CAP engineer Cy Perkins calls for closing up the big access door permanently, that is, permanently as far as servicing the airplane with hydraulic fluid is concerned. In its place in the Perkins design will be two smaller access doors installed in the larger panel, a forward door measuring 4¼" x 4¼" providing access to the tank filler neck, and a rear door measuring 4¾" x 4 9/16", which gives access to the dip stick.

The major concern with the in-flight opening of the large Lockheed panel was the severe buffeting that it caused. The door was hinged at the front and its location in the leading edge area of the left wing (between the fuselage and the No. 2 engine) gave it the tendency to stand open about six to eight inches above the wing and flap in the airstream once it became unlocked in flight.

In the design of the new doors, the reverse approach is used by Capital. The doors open at the forward end and during flight tests already completed were found to flip over and lie flat when opened in flight and cause no noticeable buffeting except at airspeeds far below those experienced in normal operation.

The design of the new door is completed and the test flights have been conducted. Capital is now working the project out with its local CAA office and, once approved, will proceed with a fleetwide modification.



HYDRAULIC RESERVOIR ACCESS PANEL REWORK

Explosion Danger Reduced in Oxygen Kit

When the valve of a Scott emergency kit oxygen cylinder model 6350-A-0600 was opened recently, a violent explosion followed, damaging the regulator interior and the body cover assembly. A check with the manufacturer showed the cause to be roughness or fraying of the nylon valve seat in the primary stage of the regulator. Pressure and temperature rise in the regulator upon opening ignited the nylon seat.

As an interim measure the operator has reduced the pressure on all cylinders of the type to a maximum of 1,400 psi, tests by the manufacturer indicating that combustion could not be created with pressures at or below 1,600 psi.

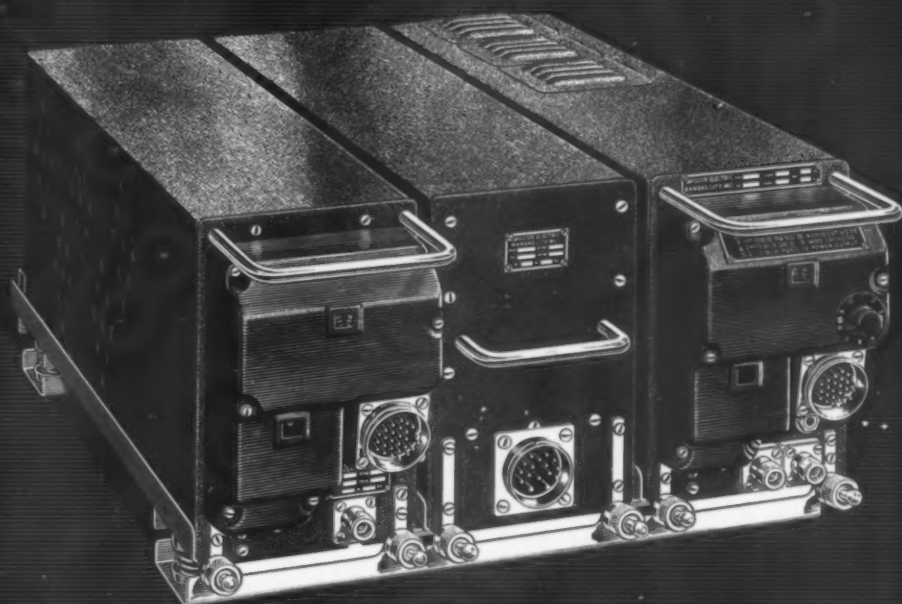
For a final fix, Scott Aviation Corporation has designed a new regulator valve seat assembly which considerably reduces the explosion danger by improving heat dissipation. The airline plans to use the lower oxygen pressure until the new valve seat can be installed.



AA Throttle Jig

Trial and error adjustments are expensive, particularly when the proof of the adjustment lies in another test hop. A suggestion to eliminate such methods by the use of a jig for setting American Airlines' Convair 240 throttle switches brought John Snook, mechanic in AA's Tulsa overhaul shop, a \$35 award.

To install the jig it is necessary only to remove the control pedestal cover above and below the throttle levers. The jig is then held in place between the levers using the two pedestal cover screws. The throttle lever position where each micro switch (auto-feather, landing gear warning, reverse safety and reverse) should open or close can easily be determined with its use.



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concept became a part of you . . . part and parcel of your hard-won maturity of judgment.

You faced a communications equipment decision for your corporation's aircraft. You heard that the Wilcox 440A VHF Airborne System—used by airlines all over the world—had been designed and built to unparalleled standards of quality. That not once—from dream to drawing board to loading dock—had the promise of *dependability* been compromised.

Each feature offered stronger evi-

dence. Powerful plane-to-tower attention guaranteed by the 50 watt transmitter. Clear-as-a-bell signals *always* because of the extra sensitive receiver. You grew more excited as you learned that no matter where in the world you fly—now or in the future—all 180 channels would be yours to use.

Then it came—the icy realization that you couldn't take a chance, that far more than an equipment purchase was at stake.

And you didn't hesitate a minute!

Your inquiry on the Wilcox 440A System or its companion, the Wilcox 429A Glideslope Receiver, is invited. Please address your inquiry to the personal attention of Mr. Donald E. Busse.

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New Ignition Lead for Convair 240's

A new low-tension ignition system transformer coil to spark plug lead, manufactured by the Scintilla Magneto Division of Bendix Aviation Corporation, is being installed by American Airlines on its Convair 240 aircraft. It consists of multiple layers of nickel braid

with a plastic made from B. G. Goodrich Chemical Company's Geon vinyl paste resin between each layer. It replaces the rubber-covered leads, said to have deteriorated quickly from contact with ozone from electrical discharges and heat from the exhaust system.



CHIEF PILOT Stout and his switch.

New Switch Simplifies ILS, GCA Approaches

ILS and GCA approaches on California Central Airlines Martin 2-0-2 airplanes are being simplified by the addition of a spring loaded interrupter switch on the pilot's control wheel.

Previous cockpit design provided an on-off toggle switch mounted to the left and forward of the pilot's seat to cut off the sound identifying outer and inner fan markers, which interfered with tower and radar approach control voice instructions.

The new switch and its location, designed by CCA chief pilot C. L. Stout, will permit two-hand control at all times, eliminate the distraction of the fan marker sounds, and provide automatic reinstatement of the signal circuit.

Evacuation Chutes Replace Ladders

Emergency evacuation chutes are recognized as an acceptable substitute for the emergency ladder in a recent revision of the Civil Aeronautics Administration aircraft specification for the Douglas DC-4, and CAA plans to extend this recognition to all other types of aircraft as the specifications require revision.

Some operators using evacuation chutes have reported programs to remove the 20-pound ladder installed in Douglas DC-4 and DC-6 airplanes.

Daily Utilization

Average Revenue Hours of
Use Per Day Per Aircraft

| International | Quarter Ending Sept. 30, 1952 |
|---------------|--|
| American | 2 eng. pass. ... 4:40 4 eng. pass. ... 5:29 |
| Braniff | 4 eng. pass. ... 8:18 |
| C & S | 2 eng. pass. ... 8:58 4 eng. pass. ... 9:28 |
| Colonial | 2 eng. pass. ... 9:17 4 eng. pass. ... 8:56 |
| Eastern | 4 eng. pass. ... 9:23 |
| National | 2 eng. pass. ... 1:30 4 eng. pass. ... 10:19 |
| Northwest | 4 eng. pass. ... 7:33 cargo ... 7:45 |
| Panagra | 2 eng. pass. ... 3:26 4 eng. pass. ... 5:29 cargo ... 3:10 |
| Pan American | 2 eng. pass. ... 3:22 |
| Latin Amer. | 4 eng. pass. ... 7:39 cargo ... 2:99 |
| Atlantic | 2 eng. pass. ... 1:27 4 eng. pass. ... 6:11 cargo ... 6:59 |
| Pacific | 4 eng. pass. ... 6:51 |
| Alaska | 4 eng. pass. ... 8:43 cargo ... 10:21 |
| TWA | 4 eng. pass. ... 8:07 cargo ... 4:26 |
| United | 4 eng. pass. ... 5:46 |

Local Service Carriers

| | | |
|----------------------------|---------------|------|
| Allegheny ¹ | DC-3 | 5:24 |
| Bonanza | DC-3 | 6:28 |
| Braniff ² | DC-3 | 6:22 |
| Central | DC-3 | 5:53 |
| Empire ³ | DC-3 | 4:41 |
| Frontier | DC-3 | 7:28 |
| Lake Central | DC-3 | 4:41 |
| | Beech Bonanza | 1:37 |
| MCA ⁴ | DC-3 | 6:15 |
| Mohawk ⁵ | DC-3 | 5:59 |
| North Central ⁶ | DC-3 | 5:36 |
| Ozark | DC-3 | 6:34 |
| Piedmont | DC-3 | 8:10 |
| Pioneer | Martin 2-0-2 | 6:13 |
| Southern | DC-3 | 6:45 |
| Southwest | DC-3 | 6:08 |
| Trans-Texas | DC-3 | 5:37 |
| West Coast ⁷ | DC-3 | 5:00 |
| Wiggins | Cessna T-50 | 2:14 |

1. Formerly All American Airways. Change in name was effective Feb. 10, 1953.

2. Figures cover operations of local service route 106 operated since August 16, 1952, by Braniff Airways as result of Braniff-MCA merger.

3. Figures are through July, 1952, only. Merger between West Coast Airlines and Empire Air Lines was effective August 4, 1952.

4. Figures are through August 15, 1952 and cover operations of local service route 106 (see footnote No. 2 above).

5. Formerly Robinson Airlines Corp. Change in name was effective August 23, 1952.

6. Formerly Wisconsin Central Airlines. Change in name was effective December 16, 1952.

7. Merger between West Coast Airlines and Empire Air Lines was effective August 4, 1952, West Coast being the surviving company.

NOTE: Above figures include both scheduled and non-scheduled operations.

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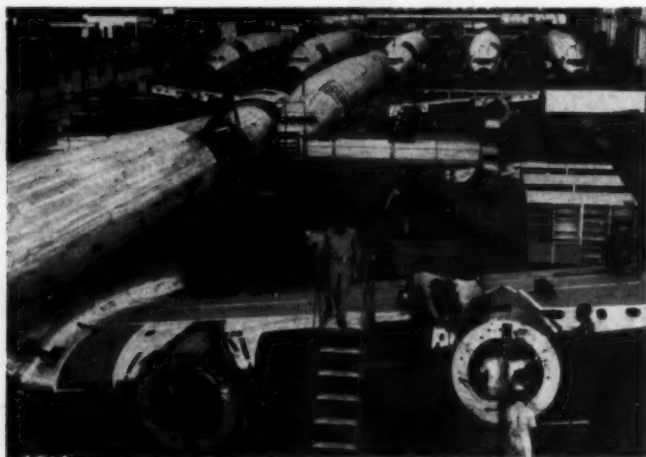


*As listed by: C.A.B. "World Directory of Airlines" and International aviation trade press

MARCH 16, 1953



Republic's record production is partially shown in the above view of the F-84G production line. Republic has been leading producer of military aircraft for the last two years. The "G" is an in-flight-refueling Thunderjet. Also being built at the Farmingdale, Long Island, plant is the new F-84F Thunderstreak.



Production Line-Up

Lockheed's rush to finish up work on a backlog of \$400 million in Super Constellations will send as many of the aircraft out the door during the next three years as the firm has produced in the last 10. Navy Connies are shown at left, capable of seating 106.

Douglas' B-47's pose for their first picture on the Tulsa division final assembly line. Angling the fuselages on the line requires less space than the nose-to-tail arrangement. First Douglas-Tulsa B-47 flew in December.



Date Set for Comet II

The first production model of the de Havilland Comet II will fly either late in June or early in July. The aircraft's fuselage is virtually complete and ready for wing mating. An additional safety feature will be incorporated in the Comet II, a new non-locking brake made by Dunlop and known as the Maxaret.

Work on the Comet III has been started and the aircraft will fly sometime next year. The seventeenth Comet I/IA was rolled out in the middle of last month, leaving only four planes to complete this series.

C-W Sells Trainers

Electronic flight trainers recently purchased by Air France from Curtiss-Wright Corporation were the first purchase of such equipment in the U.S. by a foreign airline, according to C-W. Trainer will be used for pilot refresher courses in navigation and installation will be made at the Air France Orly Field (Paris) base.

Obituaries

EDWARD MOODY SEAY

Edward Moody Seay, 53, assistant to the vice president of American Airlines, died after a long illness at his New York home on February 25.

An expert on veterans affairs, Mr. Seay joined American in 1944 as a counselor on veterans affairs. In his later capacity as assistant to the president he served as coordinator of airline relations with state and local governments. Prior to going with American, he was veterans counselor for the National Association of Manufacturers and was active in veterans organizations.

He is survived by his wife, Mrs. Ann Thomas Harrison Seay.

EARL ORTMAN

Earl H. Ortman, 41, former test pilot and racing flyer, died of a heart attack on February 27 at Miami, Florida, after a year's illness.

In addition to being a frequent participant in the national air races, Mr. Ortman was a test pilot for Douglas and Lockheed and at one time flew for Colonial Airlines.

A. J. EDWARDS

A. J. Edwards, 70, aviation veteran, died in San Diego in early February. One of the founders of Lindbergh Field in San Diego, Mr. Edwards was at one time production manager for the old Ryan Aircraft Company, general manager of Swift Aircraft Company, and sales manager for the old Stearman Aircraft Company in Wichita.

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American Aviation makes a

Clean Sweep

in TWA's 15th Nationwide Aviation Writing Competition

Sept. 15, 1951 to Sept. 15, 1952

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Ready for Hanging

One of a series of selected portraits of some very select members of the airline family, as seen by the eye of Richard E. Chamberlain.



Temco to Convert Twin-Engine Navions

Temco Aircraft Corporation will perform the complete conversions of a minimum of 100 single-engine Navion's into twin-engine, four-place executive aircraft under terms of a \$1,900,000 contract with Riley Aviation Manufacturing of Fort Lauderdale, Florida. Riley will be responsible for sales, engineering, and tooling. Expected to continue through May, 1954, the program has already gotten under way at Temco's Greenville Division.

The conversion to the Riley Twin Navion calls for:

- Installation of two 140-hp Lycoming engines mounted in wing nacelles, replacing the original nose-mounted engines.

- Reinforcement of wing structure to support nacelles.

- Installation of new, larger rudder and tail assembly.

Other features of the conversion include a new metal nose which serves as a baggage compartment; new instrument panel; pedestal-mounted controls for throttle, propeller pitch, and fuel mixture; toe brakes on pilot's side; and Goodyear wheels and brakes with six-ply tires. New interiors and choice of four interior and exterior color schemes complete the conversion.

Further improvements are being sought by Temco and Riley engineers. The first one contemplated is use of 150-hp engines with full-feathering props.

ICAO Studies Navigation Problems

A conference covering associated subjects in the field of air navigation is now under way at ICAO headquarters in Montreal. It is the first ICAO technical conference of this nature; hitherto ICAO technical meetings have dealt with individual subjects rather than with a group of interrelated problems.

Subjects to be discussed at the conference include:

- Visibility and the height of the cloud base at or near airports;
- Aircraft position, operational, and meteorological reports;
- Use of meteorological broadcasts and other meteorological transmission to aircraft in flight;
- Amendments to procedures for instrument approaches;
- Development of standard holding patterns;
- Development of radar procedures for en route, approach, and landing operations;
- Coordination and improvement of existing aids to approach and landing.

CAB Asks Airworthiness Review Proposals

The Civil Aeronautics Board's preparation for the 1953 annual review of airworthiness regulations is under way with request by the Board's bureau of safety regulation for industry proposals for deletions, additions, or amendments to be submitted not later than April 1, 1953.

Major issues of airworthiness regulation for this year's review, according to the Board, include preliminary discussions of "certain principles and even details" of jet transport aircraft requirements, although CAB does not see that extensive additions can be made to the regulations on this subject this year.

Apparent from the Board's standpoint is a need for early resolution of the conflict over the establishment of a transport helicopter category, a point which the industry opposed during the 1952 session and which CAB intends to place on the agenda this year.

Unless industry raises new subjects for discussion, indications are that the 1953 annual review will be confined to CAR Parts 4b and 6, with the former including the proposals of the CAA. CAB committee on performance and the discussion of jet transport requirements and with the Part 6 talks relating to a transport category helicopter.

How Metals and Plastics Compare

| Material | Specific Gravity (S. G.) | TENSILE STRENGTH (1000 PSI) | | | | | | | |
|---------------------------|-----------------------------|-----------------------------|----------------|---------|----------------|---------|----------------|---------|----------------|
| | | Room Temp. | | 250° F. | | 400° F. | | 500° F. | |
| | | F | F | F | F | F | F | F | F |
| | | t u | t u S.G. | t u | t u S.G. | t u | t u S.G. | t u | t u S.G. |
| 181-111 Fiberglas | | | | | | | | | |
| BV-17085 Resin | 1.80 | 47.5 | 26.4 | 37.0 | 20.6 | 27.2 | 15.1 | 15.1 | 8.6 |
| 181-111 Fiberglas | | | | | | | | | |
| BVQ-11946 Resin | 1.80 | 51.5 | 28.7 | 46.4 | 25.9 | 42.1 | 23.5 | 35.3 | 19.6 |
| 143-114 Fiberglas | | | | | | | | | |
| BVQ-11946 Resin | 1.80 | 72.0 | 40.0 | 55.2 | 30.6 | 32.0 | 17.8 | 16.9 | 9.4 |
| 24ST3 Aluminum | | | | | | | | | |
| Alclad | 2.80 | 65.0 | 23.2 | 57.8 | 20.7 | 39.6 | 14.1 | 25.2 | 9.0 |
| 75ST6 Aluminum | | | | | | | | | |
| Alclad | 2.80 | 74.0 | 26.4 | 66.8 | 23.8 | 18.7 | 6.7 | 12.5 | 4.5 |
| 302-1/2 H Stainless Steel | 7.90 | 150.0 | 19.0 | 141.0 | 17.9 | 135.0 | 17.1 | 132.0 | 16.7 |
| ZK-60A Magnesium | 1.80 | 52.0 | 28.9 | 31.8 | 17.6 | 15.5 | 8.6 | 6.1 | 3.4 |
| RC-130A Titanium Alloy | 4.70 | 150.0 | 31.9 | 129.0 | 27.5 | 117.0 | 24.8 | 112.0 | 23.8 |

* Ultimate tensile strength.

SUPERIORITY IN TENSILE STRENGTH of plastics to metals at high temperatures is shown in table above.

For High Speeds, High Temperatures: Plastics

Metals commonly used in aircraft wilt in temperature range of supersonic flight; plastics may be answer.

ALTHOUGH nearly all aircraft and guided missiles now fly at subsonic speeds (the only exceptions being small missiles and research aircraft which operate for short periods of time) and operate in temperatures ranging from minus 65° to plus 150° F., the sonic and supersonic aircraft now being designed and built will be subjected to much higher temperatures. These temperatures result from the ram compression temperature rise caused by the aircraft's speed.

This temperature rise is caused by the transformation of some of the plane's kinetic energy into heat energy, and is directly proportional to the square of the air velocity, i.e., if the aircraft's speed is doubled, the ram temperature rise increases four times.

Thus while current planes traveling at the speed of sound at 30,000 feet (675 mph) have a ram temperature rise of from 70° to 90°, at 1,300 mph it is possible to exceed 300°, and at 2,600 mph the temperature might even go over 1,000°.

Unfortunately these increased temperatures have adverse effects on lightweight metals and steels currently used in aircraft construction. Above 300° the mechanical properties of aluminum alloys fall off rapidly, and at 500° the strength of aircraft structures would be

reduced to about 75% of normal. Deflections of wings, fuselages, and tail surfaces would be magnified four times.

What can be done to take care of this problem? William E. Braham, chief engineer of the Zenith Plastics Co., Gardena, Calif., addressing the Society of the Plastics Industry in Washington last month, pointed out that such materials as Bakelite's BV17085 and BV11946, Cincinnati Testing Laboratories' 91LD, and "Durestos," now coming into wide use in Britain, might well be the solution.

Reporting on Britain's Royal Aircraft Establishment's use of Durestos, made of asbestos fibers about 3/16" to 3/8" in length and impregnated with phenolic resins, the Zenith engineer said two delta wings made of this material were scheduled to be completed by the beginning of 1953. One wing is to be used in the RAE's Structures Development Laboratories for static tests and the other is to be installed on the Fairey E10/47 research plane for flight tests.

Braham said he had seen these wings under construction and had concluded, after talking to British experts in plastic and plane building, that the time, tooling costs, and space required to produce them and other plastic plane parts were "very much less" than for comparable wings made of metal.

He also pointed out that the Durestos used to build them is not the best now available in England, since improvements following construction of the two wings have produced some compositions which developed moduli of elasticity of 9,000,000; shear moduli of elasticity of 1,000,000; and tensile and compressive strengths of at least 40,000 pounds per square inch, with no appreciable change in properties from minus 65° to plus 500° F.

The British, Braham said, have also bonded Durestos to plastics and metals, with resultant savings in weight, parts, and strength. And, he predicted, it will probably appear in British aircraft and guided missiles in wings and fuselages in increasing quantities before very long.

The Zenith Plastics Co. engineer warned that Durestos should not be considered a better or more suitable material than American glass fiber plastic impregnated composition. Instead, he said, it should be thought of as a material usable for primary aircraft structures, just as light metal alloys, stainless steels, titanium, or American reinforced plastics are used.

His own firm, Braham reported, is now conducting design studies on complete wings and fuselages for jet planes. Zenith has already made "on relatively low-cost tooling" a radar housing about 30' by 20' by six feet; an aircraft fuselage section 18' by six feet by 3 1/2 feet; highly stressed tail surfaces; and similar complex structural components. • • •



FUSELAGE MOVES on dollies onto flat-bed trailer for 10-mile run from Torrance to final line at Douglas-El Segundo plant. Time is saved by making transfer at night.



SPECIAL TRAILERS carry sub-assemblies from sub-contractors to final assembly plant. Big rig makes 900-mile round trip in 28 hours between El Segundo and Oakland (San Leandro and Hayward). Large trailer hauls fuselage and center section. "Pup" hauls outer wings.



THIS RIG carries raw parts to Reno, Nev., brings back horizontal stabilizer, rudder and flaps. Run is 960 miles long, takes 34 hours for turn-around. Trailer is standard van.

Trucks Keep Production Rolling

By FRED S. HUNTER

THAT big diesel-powered tractor-trailer rig you pass—or passes you—on a California highway may belong, not to Pacific Freight Lines, but to the Douglas Aircraft Co.

It's symbolic of the new style in aircraft manufacture—big sub-contracting.

In Dallas, Reno, Hayward, Calif., San Leandro, and Fresno, thousands of workers put together assemblies for planes they'll never see. In Texas, Nevada and California they're laboring in plants that ordinarily make car springs and bumpers, and machines for dispensing pop. The fuselages, wings, and rudders they rivet into flying units are put together on the assembly lines in El Segundo. The Douglas truck line ties it all together.

At Douglas-El Segundo about 40% of the work is sub-contracted. Faster production is one aim. Tapping pools of labor on their home grounds and utilization of factories that otherwise might have to close down for lack of materials should all-out war come are others.

During the last war, at the Navy plant at El Segundo, Douglas broke production records turning out SBD dive bombers. Where Douglas El Segundo had 1,490,000 square feet of floor space



BITS AND PARTS reach Nevada Air Products Co. in boxes. Completed horizontal stabilizers, rudders and flaps are stowed in trailer for quick delivery to assembly plant.



ON FINAL ASSEMBLY LINE at El Segundo, sub-contracted AD-4 attack bomber begins to look like an airplane.

then, it now has 3,850,000 square feet. Where it was concentrating on one 7,500-pound airplane, it now has five different production lines in the works and is putting together airplanes making use of three different kinds of power and having as many different kinds of wings. It makes quite a difference in production techniques.

Douglas-El Segundo production starts at Torrance in an auxiliary plant called B-6. It was an Alcoa Aluminum Co. plant during World War II. The Navy acquired it early in 1952 and turned it over to Douglas under lease. The lion's share of a Navy \$25,000,000 machine procurement program for the El Segundo division of Douglas goes to Torrance.

The machined parts are made at Torrance. Then they are rushed in the huge truck-trailers to the distant sub-contractors. In each feeder city, the parts are discharged and finished assemblies loaded.

A fuselage, complete except for electrical installations and controls, boards the trailer at San Leandro, Calif. Hayward loads the center wing section. Fresno sends outer wings. Reno fabricates the horizontal stabilizer, rudder and flaps.

Back in Torrance, Douglas workers add electrical and hydraulic systems. Again the growing plane takes a ride, to the El Segundo plant 10 miles dis-

tant. There it starts down one of the assembly lines.

The big trucks operate on routes on schedule. They carry the parts up, the completed assemblies back, thus avoiding dead-heading. They roll straight through day and night, carry relief drivers. They're as big as anything on the highway. The limit for a rig in California is 60 feet. With trailer and a "pup," a Douglas rig measures just 59½ feet. Douglas keeps four of these big trailer-trucks in constant operation for its El Segundo division alone.

These are major sub-contractors giving a boost to Douglas production of AD Skyraiders, F3D Skynights, A2D Skysharks, F4D Skyrays, and A3D attack bombers: Temco in Dallas; Nevada Air Products in Reno; Western Sky Industries in Hayward, Calif.; L. A. Young Wire & Spring Co. in San Leandro, Calif.; California Cornice Steel & Supply Co. in Los Angeles; Vendorlator in Fresno; and Domanco, Interstate, Pastushin, Western Stove, Marquardt Aircraft, and Weber Aircraft in the Southern California area. • • •



OUTER WINGS now have been attached and the AD-4 is buttoned up. Inspectors check it thoroughly before rolling it outdoors for final work and delivery to the Navy.

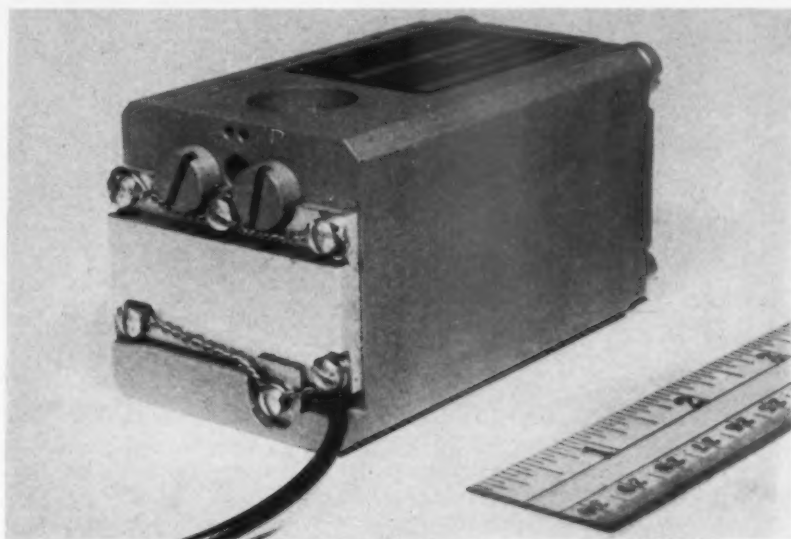
New Products

New Lubricant

A new lubricant called Molykote-Silicone Type 77 is particularly adapted for use with synthetic rubber plastics, leather, nylon and fiber bearings, and all metals, according to its producer, the Alpha Corporation.

A grease compound, made up of Molykote type Z powder processed with a high grade silicone fluid and a stabilizer, the new lubricant is reported to have an operating range from -50°F. to 400°F. meeting occasional peaks up to 600°F. Chemically inert to the materials for which its use is intended, Molykote-Silicone Type 77 also features resistance to oxidation and gum or varnish formation.

Address: The Alpha Corporation, 179 Hamilton Ave., Greenwich, Conn.



Electro-Hydraulic Control Valve

An electro-hydraulic pressure control servo valve introduced by Standard Controls, Inc., is designed for use in high performance servo systems and regulates the differential pressure of hydraulic fluid at the output ports proportional to an electrical input signal.

Operating with supply pressures ranging from 500 to 3,000 psi, the model PC-1

valve, as it is identified, has a power rating of 4.2 hp with the 3,000 psi supply pressure. Maximum differential pressure output of positive or negative supply pressure is obtained with an eight ma. differential current input. Unit measures $2'' \times 2'' \times 3.5''$ and weighs 1.4 pounds.

Address: Standard Controls, Inc., 1230 Poplar Place, Seattle 44, Washington.



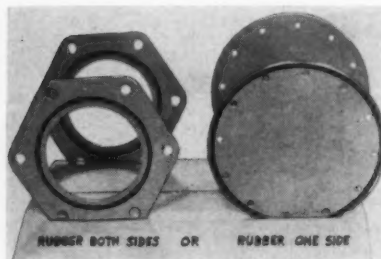
Nose Steering

An aircraft power steering mechanism which replaces the conventional nose strut torque link and which combines steering and shock functions into a single mechanism has been announced by the Bendix Products Division, Bendix Aviation Corporation.

The new mechanism is made up of two power cylinders which are hydraulically operated by pilot control and which replace the usual upper torque links of the shock strut scissor. These are connected to the lower torque link at the knee by a ball and socket coupling. Hydraulic hose and a control valve provide system hydraulic pressure and pilot operation of the steering system.

In addition to laboratory tests, Bendix has used the new steering mechanism on its B-25 flying laboratory, including static torque, fatigue, and flight testing.

Address: Bendix Products Division, Bendix Aviation Corporation, South Bend, Ind.



Sealing Device

A new sealing device, called Gask-O-Seal, in which a rubber sealing gland is mechanically bonded into the machined groove of a flat metal surface, has been introduced by the Franklin C. Wolfe Company.

Based on the sealing principles used in the company's Lock-O-Seals for aircraft

bolts, rivets, and studs, the new device is designed to replace AN 763 flat gaskets for sealing hatch covers, access doors, and hand-hole covers. Features claimed for the new method are: no cold flow under high or low pressure; a perfect seal with low bolt torque with considerable net weight saving; rugged one-piece construction permitting re-use; and fully retained rubber which cannot blow out.

Address: Franklin C. Wolfe Co. Inc., 3644 Eastham Drive, Culver City, Calif.

Servo Motors

Precision in the order of plus or minus 0.0001" tolerances are involved in the manufacture of miniature servo motors announced by G-M Laboratories, Inc. Measuring one inch in diameter and slightly over one inch in length, the new motors are available for frequencies ranging from 60 to 400 cycles and in two, four-, or eight-pole construction. Stall torque of the servo ranges from .25 to .35 oz.-in. and output shaft can be supplied to suit customer specifications, with or without integral pinion.

Address: G-M Laboratories, Inc., 4800 North Knox Ave., Chicago 41, Ill.

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FLIES AMERICA'S NEWEST



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CARLISLE, PENNSYLVANIA



Altitude Monitor

An altitude monitor said to be ten times more sensitive to changes in pressure than earlier instruments of this type has been developed by the Kollsman Instrument Corporation. Used for the flight programming of aircraft and guided missiles, the altitude monitor consists basically of a temperature-compensated diaphragm mechanism and an inductive pick-off.

Other variations of the "altitude" unit provide data such as airspeed, vertical speed, differential and absolute pressure. Of the sensitivity of the new series, that of the altitude monitor is demonstrated in its reported ability to respond to less than one foot of altitude change in 50,000 feet.

In operation the inductive pick-off, activated by the diaphragm, electrically signals the approach to a preset pressure, and thereafter, signals variations from that point within a specified range. The design of the diaphragm mechanism stresses simplicity. A "C"-shaped iron armature is moved by the diaphragm, while a "T"-shaped electromagnet, which is surrounded by the armature, is moved by an externally adjustable shaft. Symmetrically wound on the field structure are four coils forming an inductive bridge.

When the armature is midway between the two ends of the field structure, the bridge is balanced and the output of the control is a null. When moved to one side, the inductance of that side decreases and that of the other side increases, with a resultant output from the bridge of a magnitude proportional to the distance of the armature from the center.

Address: Kollsman Instrument Corporation, 80-08 45th Avenue, Elmhurst, N. Y.

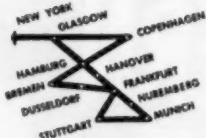
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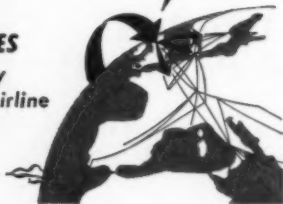


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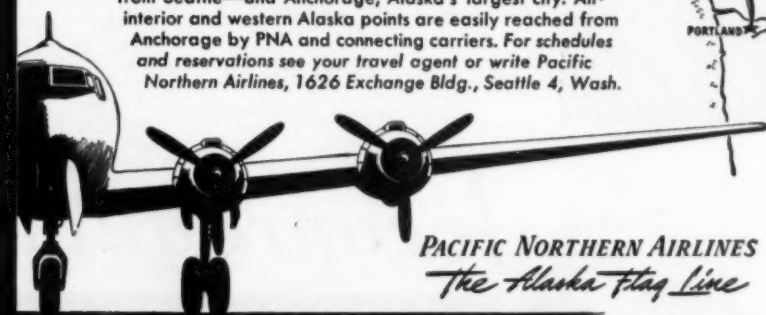
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21st YEAR OF SERVING ALASKA



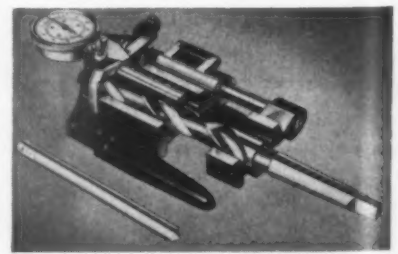
Lightweight Motor

A permanent magnet motor weighing seven ounces and providing speed ranges from 5,000 to 20,000 rpm has been developed by the Barber-Colman Company. Used in such aircraft applications as electro-mechanical actuators, generators, and fan and blower drives, the new motors feature a symmetrical armature winding, said to provide true electrical balance, superior commutation, low radio noise interference, and 25% higher efficiency than other known windings.

Motors can be supplied for 6- to 115-volt d-c applications and at short duty cycle, up to 65 milli-horsepower is attainable for 26-volt applications. A dynamic braking design permits the motor to stop from 10,000 rpm operation in 10 revolutions.

Model BYLM 40000 shown is 1½" in diameter and 2 3/16" long.

Address: Barber-Colman Company, Rockford, Ill.



Drill Gauge

A drill gauge called the "Matrix" drill point measuring instrument has been placed on the market by the Engis Equipment Company. Used to check drill point angle and centrality, the new portable unit is intended to insure correct hole size and optimum drill life.

The "Matrix" unit is furnished in two sizes, ¼" to ¾" and ¾" to 2½". In use, two "vees" support the straight or tapered shank drill; a common indicator dial provides centrality readings directly to 0.001" and angular readings to 1°.

Address: Engis Equipment Co., 431 S. Dearborn St., Chicago 5, Ill.

AMERICAN AVIATION

Technical Literature

VARD BROCHURE. Vard, Inc., 2981 E. Colorado St., Pasadena 8, Calif., manufacturers of ball screw assemblies, worm gears and fractional hp motors, announces the publication of a 12-page brochure to acquaint the aircraft and allied industries with the products and facilities of the company.

GALVANOMETERS: New technical bulletin, issued by Trans-Sonics, Inc., Bedford Airport, Bedford, Mass., includes a table listing specific galvanometers which can be used with Trans-Sonics pickups without amplification of pickup output.

CARBON STEELS: Carbon steel specifications are detailed in a new chart showing chemical analysis requirements for each of 60 Military, Army, Navy, Aeronautical and Federal specifications. The chart has been compiled by Frasse and Co., Inc., 17 Grand St., New York 13, N. Y.

LOCKNUTS AND COLLARS: Two new four-page bulletins have been prepared by Standard Pressed Steel Co., Jenkintown, Penna., dealing with Flexloc self-locking nuts and Hallowell steel shaft collars with details on product properties and applications.

SILICONE RINGS: Data Sheet No. 103 details specifications of silicone rubber O-rings manufactured by Bacon Industries, Inc., 192 Pleasant St., Watertown, Mass.

INDUSTRIAL PLANTS: "Plant Layout," published by Wheeler Associates, Inc., 15017 Detroit Ave., Cleveland 7, O., is a booklet which discusses phases of planning work areas and basic principles of good layout.

ASSEMBLY PROCEDURES: Manual C-3 gives instructions on wiring assembly, power plug assemblies, audio plug assemblies, cable assemblies, cable clamps, keyway positioning, multiple wire coding, stripping and processing of wire and cables; it has been prepared by the American Phenolic Corp., 1830 South 54th Ave., Chicago 50, Ill.

DUCTS AND COUPLINGS: Technical Bulletin No. 8-11 describes properties and gives basic engineering data on ArcoSil silicone-fiberglass flexible ducting, tubing, sleeves, couplers and other similar parts, manufactured by Arrow-Rubber Company, Downey, Calif.

ARC-WELDING ACCESSORIES: A 12-page booklet, available from Westinghouse Electric Corporation, 401 Liberty Ave., Box 2278, Pittsburgh 30, Penna., describes a line of arc welding accessories, varying from electrode holder and ground clamps to protective clothing and headgear.

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in his
neighborhood...



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TP15-2
Air Turbine Drive
For Driving 9kva Alternators



CFT25-3
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NUR30
Air Flow 25 to 40 lbs/min

IN AIRCRAFT



M140
Air Flow Range 140 to 150 lbs/min
Nominal Air Flow 140 lbs/min



BUR20
Air Cycle Refrigeration Package
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Cabin Supercharger



S20
Cabin Supercharger
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B60
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For use with S60
Cabin Supercharger



S60
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MARCH 16, 1953

Pan American World Airways will inaugurate Atlantic tourist service at Philadelphia on April 1. Three flights weekly (Wednesday, Friday, and Saturday) will be made with DC-6B's. One will be via New York and Boston to Glasgow, Hamburg, and Frankfurt; the second via New York to Shannon, London, Brussels, and Frankfurt; the third via New York and Boston to Shannon, Paris, and Rome.

Pan American World Airways on March 1 increased Pacific service to seven flights weekly, five to Tokyo and two to Manila. Stratocruisers are used on all flights.

Allegheny Airlines set new February record by carrying 12,547 passengers with estimated revenue of \$115,809. These are increases of 3,000 passengers and \$36,000 revenue over same 1952 month, although 9,000 fewer miles were scheduled.

Colonial Airlines reports the first January profit (\$5,000) in its history. Company carried 22,101 passengers on U. S. and Canadian routes, up 30% over January, 1952, and 2,696 Bermuda passengers, up 43%.

American Airlines will add 650 new stewardesses, increasing its total to 1,050. New aircraft and more schedules make increase necessary. Company will screen estimated 25,000 applicants to obtain the quota.

Trans World Airlines on April 26 will increase weekly Atlantic Constellation tourist flights to 20.

Trans World Airlines has asked CAB permission to raise service charge on de luxe all-sleeper Atlantic Ambassador flights from \$25 to \$50, effective March 21. Berth charge, which is in addition to service charge, remains at \$35.

Southern Airways carried 122,000 passengers in 1952, up 26% over 1951. Company flew 3,330,000 plane-miles, 21 million passenger-miles, carried 950,000 pounds of mail and 850,000 pounds of express, with total revenue of \$1,250,000.

Air France's 1952 traffic showed the following increases: passenger-miles, 12%; passengers, 9%; mail, 6%; freight, 16%; mail ton-miles, 18%; freight ton-miles, 22%; and total revenue ton-miles, 17%.



Airline Commentary

By Eric Bramley

WHAT with interchanges and leased airplanes, it's mighty easy to confuse passengers these days. Let's preface this story by reminding you that Delta is operating a United Air Lines' DC-6 under lease on its Chicago-Miami route, and that Delta and TWA have an interchange service through Cincinnati.

A passenger checked in with Delta in Cincinnati the other day for a flight to Chicago. He went out and got on a Delta airplane (the only Delta airplane on the ramp) only to find a TWA stewardess aboard. She asked his destination and he answered, "Delta to Chicago."

"Oh," she said, "I'm sorry, but this is a TWA flight. If you want Delta to Chicago, please walk down the ramp and board the United Air Lines airplane."

Recently we received a piece of direct mail promotion from one of the smaller airlines. Nicely presented and interesting. But, for us, its entire effectiveness was destroyed by the fact that it contained three misspelled words, one of which was in the heading. We've been in the writing business long enough to know that errors will occur in newspapers or magazines, but it's hard to see how you could let three slip by on a card containing less than 150 words. Unfortunately, the lack of care by an employee reflects on the whole airline. In the future, more careful proofreading, perhaps?

Lockheed Aircraft Corp. continues with its heads-up Constellation promotional program. Latest piece is "The Intimate Life of an International Favorite," a small booklet for airline (Connie-equipped, of course) seat pockets. Well written, cleverly illustrated history of the Connie and Super Connie.

You've probably seen on newstands a pocket-sized TV home repair book called "Telefixit." You probably didn't know, as we didn't, that the author was John P. Kenneally, Pan American's radar training supervisor in the pilot training school at LaGuardia Field. Jack, who's only 28, decided to help TV owners by writing the book in his spare time. It must be good, because it's now in the sixth printing (total 700,000) and the publishers have contracted for an additional 300,000. More power to you, Jack.



CAB was "picketed" during oral argument on renewal of Allegheny Airlines' (formerly All-American Airways) route certificates. On the morning of the hearing, representatives of Lancaster, Pa., pulled the wagon shown above up in front of the Commerce Department, which houses CAB. The city wants direct service to Washington. The wagon, which is 160 years old, used to provide direct service for whiskey on the run between Pittsburgh and Baltimore. CAB Member Josh Lee said he thought it was the first time the Board has been picketed. Board members took it good-naturedly. The photo, incidentally, was taken by CAB.

People

AIRLINES

Promotions for the following Mohawk Airlines personnel have recently been announced: **E. A. Butterfield**, to superintendent of maintenance; **Walter J. Ferrari**, to chief dispatcher; **Robert J. Longwell**, to assistant to the general traffic manager; and **Robert P. Sherwood**, to assistant to the vice president-operations.

A. E. Towne, district sales manager for United Air Lines in Des Moines, has returned to his post after a year's tour of duty as a colonel in the U. S. Air Force.

Daniel P. Reid has been granted leave of absence from Trans World Airlines to take over the post of general sales manager for Ethiopian Air Lines. Reid, who for the past seven years has been on TWA's sales staff in San Francisco, will make his headquarters in Addis Ababa.

R. M. Barton, former sales planning superintendent for British Overseas Airways Corp., has been appointed sales manager for British West Indian Airways, one of the British Commonwealth Airlines.

Pierre DeSautels has been appointed to the newly created post of overseas director of Trans World Airlines, with headquarters in Paris. DeSautels' former post, district sales manager in San Francisco, is being taken over by **William J. Hanley**, already in San Francisco as assistant d.s.m.

J. Judson Taylor, treasurer of Western Air Lines, has been elected a vice president. Taylor will continue to serve as treasurer of Western.



Taylor



Lake

MANUFACTURING

William T. Lake has been elected to the post of comptroller for the Curtiss-Wright Corporation. Lake joins Curtiss-Wright from the Ford Motor Co., where he served as comptroller for several Rouge plants.

Milo F. McCammon has been made director of manufacturing of the Eclipse-Pioneer Division of Bendix Aviation Corp. Prior to his new post, McCammon served on the staff of **Raymond P. Lansing**, Eastern Division vice president of Bendix.



The following employees have recently completed 20 years or more of service in the aviation industry.

- **Joseph H. Bell**, Trans World Airlines. Superintendent, flight dispatch, Kansas City. 20 years.
- **Lester D. Munger**, Trans World Airlines. Supervisor, flying, Kansas City. 20 years.
- **Joseph M. Crowl**, Trans World Airlines. Senior engineer, Kansas City. 20 years.



M. E. Oliveau, (left) European representative for Douglas Aircraft Co., makes first visit to Santa Monica in 14 months to receive 20-year pin from President Donald Douglas. **F. W. Conant** (right), senior vice president, who received his 20-year pin at same time, beams approval. Oliveau makes his headquarters in Geneva, Switzerland, where the Douglas European office recently was moved from Brussels.



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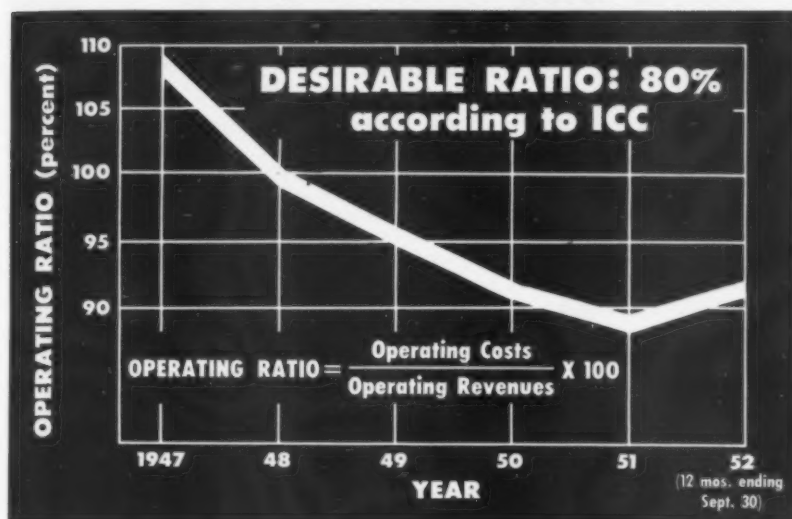
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Skating on Thin Financial Ice



AIRLINES feel operating ratios reflect truer picture of mounting costs than rate of return.

Fare Inquiry Threatens Future Profits

Airlines claim new equipment financing plans are at stake, ask new CAB approach.

THE DOMESTIC trunk airline industry wants CAB to drop its General Passenger Fare Investigation. With hearings slated for May 1, a virtual eleventh-hour plea of several airlines is gaining impetus and will soon amount to unanimous industry action.

At issue chiefly is the question of whether airline earnings are too high under the present fare structure. The airlines not only think their earnings are not excessive but feel CAB is endangering the investment status of the industry by the mere existence of the fare probe at a time when the solid investment dollar is needed to finance necessary new equipment.

Northeast, C&S, Western, and Delta had filed for dismissal as this issue went to press. Remainder of the industry was expected to follow.

Paramount in their arguments are these points:

- **Rising costs** through 1952 offset substantial traffic gains and a fare reduction at this time would seriously endanger the stability of the industry.

- **If CAB questions** airline earnings, conducting a general fare investigation or getting answers the hard way.

- **A more equitable** and economical approach would be for an individual CAB study of the fare structure or for CAB to give consideration to switching

from the "return on investment" yardstick for measuring earnings to the "operating ratio" approach.

- **The already weak investment** status of airline stocks in the eyes of sound investors would be further weakened by the threat of a possible fare cut.

The investigation was instituted by CAB on April 9, 1952, at the same time a \$1 across-the-board fare increase was effected by the industry. Despite that increase, the net operating income of the industry dropped approximately 10% in 1952 as compared to the previous year.

Adverse Effects

Delta, in its petition, indicates that a 1/2¢ reduction in first class fares would mean a \$47.5 million loss in revenues to the industry, would throw three airlines in the red, and further increase the red figures of a fourth line, in addition to producing other adverse effects.

C&S envisions any reduction which may be brought about by the probe as requiring many airlines now on service mail rates to go back on a subsidy basis. The carrier suggested that CAB should not continue to regulate air transportation on a "rate of return" basis.

It is obvious, C&S continued, "that sound economic conditions in the industry cannot be maintained under such

a theory, because of the high capital turnover in air transportation and the small margin of operating profit which results from application of the usual 'rate of return' yardstick."

For 1952, considered a "boom" year for the airline industry, its operating ratio was 87%, as compared to 84% in 1951. Operating ratio is the relation of operating expenses to operating revenues; the difference is operating income. Thus, a 16% margin in 1951 was reduced to a 13% margin last year, despite a 15% increase in operating revenues.

Operating Ratio

To promote stability and economic soundness in the industry, the carrier suggested that CAB consider, instead of the lengthy fare probe, a switch to the "operating ratio" approach. This could be done expeditiously in pending mail rate proceedings on a policy basis and "need not be complicated by the tedious and costly procedures of a general fare investigation."

Northeast, one of the smaller regional trunks, advanced a significant argument. It simply is not equipped staff-wise to cope with the size of the proceeding. An ICC bus fare investigation from 1946 to 1950 was estimated to have cost that industry approximately \$1 million, aside from the cost to the Government. Airlines feel the CAB probe will cost the air industry that much or more.

Furthermore, they argue, by the time the case is completed economic conditions could be so changed as to render valueless a record compiled on statistics of the present day.

Even employing CAB's yardstick of "rate of return on investment," the airlines contend their position is not such as to warrant the investigation. In 1951, the overall return for the domestic trunk industry was only 6.71%.

This, Western contends, is not sufficient to attract sound investors. That carrier summed its argument up this way: "There is a grave danger that the mere existence of such an investigation will have such an unsettling effect on the investing public that the airlines will be unable to obtain financing for the new equipment which is vitally necessary to meet the rapidly expanding demand for air transportation."

Ozark Seeks Renewal

Ozark Air Lines, whose local service airline certificate expires September 26, 1953, has applied to CAB for a seven-year renewal. The certificate will remain in effect until CAB decision on the renewal bid.

Defense Backs Cargo Route Bids

Armed with the support of the Department of Defense and three major eastern cities, six applicants for trans-Atlantic all-cargo certificates opened their bids before the Civil Aeronautics Board this month.

For three of the lines, Seaboard & Western, Transocean, and European-American, the hearings being held by Examiner Herbert K. Bryan were a repeat performance. All were denied certificates previously but granted new trials at the direction of former President Truman.

New entries are Flying Tigers, Trans Caribbean, and Overseas National. All are weighing heavily on national defense aspects of the proposed services and the trend in the trans-Atlantic cargo field in which, they claim, the foreign flag carriers are taking the play away from U. S. certificated lines.

The Defense Department, with Col. C. Frank Snyder, USAF testifying, stated its position as "favoring establishment and expansion of civil air cargo service between the U. S., Europe, and the Middle East." Among reasons given was one that "present air cargo service provided by U. S. flag lines is considered

inadequate to meet military and civil requirements."

The senior aviation analyst for the Port of New York Authority, Walter B. Robinson, testified that operation of all-cargo service, preferably on a "demand, area-type" basis, is the most practical effective means of developing the bulk air freight market between the areas involved. He introduced an exhibit showing that of 528 scheduled trans-Atlantic cargo flights in 1952, only 30% were operated by U. S. lines.

Senior applicant in the case of Seaboard & Western which first filed for a trans-Atlantic certificate in July, 1947. Subsequently, Transocean filed and the two went to hearings in October, 1950. European-American is a non-operating airline now headed by Charles Longacre, one-time assistant to former CAB chairman Delos W. Rentzel. Its original bid was turned down in the Trans-Atlantic Renewal Case last year.

Of the new applicants, Flying Tiger is a certificated domestic all-cargo line; Trans Caribbean and Overseas National are classified as large irregulars with considerable experience in international operations. Hearings were expected to last through March.

Airlines Fight Resort's Miami Stop

A sharp fight before CAB is shaping up on the controversial question of Resort Airlines granting stop-overs at Miami on Caribbean cruises. The matter will soon be argued orally before the Board with four regularly scheduled lines seeing revocation of stop-over privileges for Resort, and the latter pushing its bid for stop-overs of seven days on cruises of 14 days or more.

Eastern, C&S, National, and Delta have lined up in protest of a recent CAB

action, directed by former President Truman, which defines Resort's cruise-type certificate as authorizing stop-overs at the Florida gate-way. They contend it changes the character of the certificate from "foreign" to "interstate."

As an interim measure, CAB has granted an exemption permitting stop-overs of two days on cruises of 10 or more days and of one day on others. Resort has asked that this be changed to grant seven-day stays at Miami.

CAB MISCELLANY

CAB Examiner Curtis C. Henderson has recommended against **Continental Air Lines'** proposed extension from Wichita Falls to Dallas but suggests lifting a restriction in Braniff's certificate against serving Wichita Falls and Lubbock on the same flights.

A \$100,000 RFC loan to Cordova Airlines has received the necessary CAB approval as being "in the public interest." The company, whose name has

just been changed from Cordova Air Service, said the loan is to provide "primarily for flight equipment."

Bonanza Air Lines, whose renewal case gets underway this month, has asked CAB for new routes between (1) Las Vegas and Los Angeles, (2) Los Angeles and Phoenix, (3) Reno and San Francisco/Oakland, and (4) Las Vegas and San Diego, all via one or more intermediates.

CAB News

AS OF NOW . . .

Procedural steps in the important **Pioneer Air Lines Mail Rate Case** are completed and the matter stands ready for CAB decision. At oral argument recently, the line re-capped its arguments for higher mail pay for Martin 2-0-2 operations and the right to retain profits realized from the sale of its DC-3 equipment. Entire local service industry is awaiting the outcome.

Another important mail rate case, the **Braniff Airways Domestic Rate Proceeding**, in which CAB will weigh a Post Office proposal for putting excess airline earnings in a special reserve fund, gets underway with hearings this month. Decision before the fall is unlikely.

CAB had given instructions to its examiner to expedite the **General Passenger Fare Investigation** to complete it within one year, but even assuming CAB denies dismissal petitions of the airlines, there is little chance of completing the case before 1955.

Briefs are due this month in the **Colonial Airlines Merger Proceeding**, to be followed by an examiner's report, briefs to the Board, oral argument, and decision. Parties look for a late 1953 decision.

RECENT CAB DECISIONS

• **Pan American World Airways** approved service plan for trans-Atlantic services changed to permit service to Cologne/Dusseldorf, Germany, as an intermediate between Brussels and Frankfurt.

• **BACA Airlines** denied exemption for immediate authority to carry persons, cargo, and mail between Jefferson City and Columbia, Mo., on the one hand, and Kansas City and St. Louis, on the other.

• **Trans-Texas Airways** granted continued exemption to serve Pecos and Marfa/Alpine, Texas, on the same flights operated over Fort Stockton-El Paso segment.

CAB CALENDAR

Mar. 16—Hearing in Braniff-United Denver Interchange Case. Washington, D. C. (Docket 5827).

Mar. 17—Hearing in North American Airlines Use-Of-Name Investigation. Washington, D. C. (Dockets 5774 & 5928).

Apr. 27—Hearing in National Airlines Final Mail Rate Case. Washington, D. C. (Docket 3037).

May 1—Hearing in General Passenger Fare Investigation. Washington, D. C. (Docket 5509).



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Domestic Airline Traffic for December, 1952

| AIRLINES | REVENUE PASSENGERS | REVENUE PASSENGER MILES | AVAILABLE SEAT MILES | PASSENGER LOAD FACTOR | MAIL TONNAGES * | EXPRESS TONNAGES | FREIGHT TONNAGES | TOTAL TONNAGES | REV. TRAFFIC | AVAILABLE TONNAGES | % AVAILABLE TONNAGES USED | REVENUE PLANE MILES | SCHEDULED MILES | % SCHEDULED MILES COMPLETED |
|--|--------------------|-------------------------|----------------------|-----------------------|-----------------|------------------|------------------|----------------|--------------|--------------------|---------------------------|---------------------|-----------------|-----------------------------|
| American | 398,360 | 224,398,000 | 315,078,000 | 71.22 | 2,145,552 | 1,205,332 | 4,811,681 | 30,098,400 | 43,546,776 | 69.12 | 7,402,212 | 7,437,432 | 96.42 | |
| Braniff ** | 36,935 | 33,021,000 | 60,812,000 | 54.30 | 198,916 | 137,787 | 238,891 | 3,729,201 | 7,231,017 | 51.57 | 1,768,499 | 1,998,997 | 91.98 | |
| Capital | 159,140 | 54,710,000 | 88,584,000 | 61.76 | 208,091 | 280,773 | 359,533 | 6,078,778 | 12,253,708 | 49.61 | 2,120,552 | 2,099,971 | 93.73 | |
| Caribair | 9,793 | 785,000 | 1,623,000 | 48.38 | 1,751 | 1,966 | 66,695 | 66,695 | 137,884 | 42.24 | 61,172 | 56,346 | 99.41 | |
| C & S | 42,048 | 15,903,000 | 27,008,000 | 58.88 | 87,886 | 109,374 | 119,195 | 1,840,263 | 3,308,362 | 55.62 | 783,407 | 824,237 | 93.87 | |
| Colonial | 25,308 | 6,867,000 | 12,508,000 | 54.90 | 16,439 | 11,907 | 22,664 | 706,221 | 1,409,510 | 50.10 | 356,822 | 336,000 | 93.77 | |
| Continental | 28,248 | 11,130,000 | 20,966,000 | 53.09 | 55,179 | 22,119 | 67,006 | 1,207,669 | 2,431,833 | 51.95 | 676,644 | 672,032 | 99.12 | |
| Delta | 84,071 | 40,984,000 | 61,007,000 | 67.18 | 235,540 | 152,676 | 433,223 | 4,738,044 | 7,360,167 | 64.37 | 1,567,202 | 1,533,123 | 96.67 | |
| Eastern | 336,800 | 174,369,000 | 298,699,000 | 58.38 | 578,828 | 446,535 | 639,267 | 19,776,180 | 39,870,882 | 49.50 | 5,621,075 | 5,492,444 | 96.92 | |
| Hawaiian | 27,695 | 3,615,000 | 6,552,000 | 55.17 | 5,769 | 143,215 | 442,084 | 862,333 | 1,347,632 | 51.27 | 324,401 | 236,132 | 99.56 | |
| National | 69,864 | 50,570,000 | 79,150,000 | 63.89 | 174,618 | 92,024 | 511,979 | 5,948,255 | 9,649,252 | 61.64 | 1,670,831 | 1,619,310 | 96.05 | |
| Northeast | 21,078 | 3,877,000 | 7,228,000 | 53.64 | 9,937 | 11,412 | 10,637 | 391,503 | 722,842 | 54.16 | 256,065 | 286,045 | 86.88 | |
| Northwest | 65,015 | 47,211,000 | 84,237,000 | 56.05 | 418,349 | 204,799 | 329,274 | 5,597,648 | 9,649,086 | 58.01 | 1,465,365 | 1,485,612 | 92.68 | |
| Trans Pac. | 13,154 | 1,617,000 | 4,058,000 | 39.85 | 2,319 | 9,195 | 132,839 | 132,839 | 354,987 | 37.44 | 144,934 | 128,757 | 99.68 | |
| TWA | 202,811 | 167,024,000 | 248,083,000 | 67.33 | 1,239,077 | 910,517 | 1,583,166 | 19,706,916 | 31,471,682 | 62.62 | 4,987,895 | 5,299,659 | 92.94 | |
| United | 254,308 | 170,787,000 | 261,115,000 | 65.41 | 2,411,657 | 1,421,811 | 2,346,699 | 22,535,547 | 41,223,451 | 54.67 | 6,082,377 | 6,484,758 | 91.55 | |
| Western | 61,251 | 24,264,000 | 38,500,000 | 63.02 | 166,549 | 62,498 | 75,264 | 2,621,025 | 4,104,942 | 63.85 | 1,065,351 | 1,122,053 | 94.69 | |
| TOTALS | 1,895,879 | 1,031,132,000 | 1,615,208,000 | 63.84 | 7,956,437 | 5,069,686 | 11,682,815 | 125,617,268 | 215,606,678 | 58.26 | 36,364,804 | 36,992,905 | 94.54 | |
| * Includes air parcel post. | | | | | | | | | | | | | | |
| ** Braniff's figures do not include local service segment (route 10) operated by Braniff as result of merger with NCA. | | | | | | | | | | | | | | |
| NOTE: Above figures include both scheduled and non-scheduled operations. | | | | | | | | | | | | | | |

* Includes air parcel post.

** Braniff's figures do not include local service segment (route 106) operated by Braniff as result of merger with NCA.

NOTE: Above figures include both scheduled and non-scheduled operations.

Domestic Airline Traffic for Calendar 1952

| AIRLINES | REVENUE PASSENGERS | REVENUE PASSENGER MILES | AVAILABLE SEAT MILES | PASSENGER LOAD FACTOR | MAIL TONNAGES **** | EXPRESS TONNAGES | FREIGHT TONNAGES | TOTAL TONNAGES | REV. TRAFFIC | AVAILABLE TONNAGES | % AVAILABLE TONNAGES USED | REVENUE PLANE MILES | SCHEDULED MILES | % SCHEDULED MILES COMPLETED |
|--|--------------------|-------------------------|----------------------|-----------------------|--------------------|------------------|------------------|----------------|---------------|--------------------|---------------------------|---------------------|-----------------|-----------------------------|
| American | 5,095,116 | 2,837,654,000 | 3,898,032,000 | 72.80 | 17,331,192 | 9,932,393 | 44,964,470 | 346,209,899 | 516,751,587 | 67.00 | 86,617,084 | 87,493,158 | 97.71 | |
| Braniff** | 1,005,597 | 344,807,000 | 563,303,000 | 61.21 | 1,693,586 | 1,080,644 | 2,297,127 | 38,026,520 | 70,171,097 | 54.19 | 15,977,150 | 16,340,591 | 96.57 | |
| Capital | 2,011,284 | 637,579,000 | 1,107,126,000 | 57.59 | 1,915,607 | 2,541,846 | 3,935,243 | 69,338,107 | 145,869,167 | 47.53 | 26,307,564 | 26,240,167 | 96.60 | |
| Caribair | 110,873 | 8,912,000 | 18,074,000 | 49.31 | 11,984 | 10,092 | 30,092 | 761,274 | 1,773,690 | 42.92 | 684,606 | 654,588 | 99.33 | |
| C & S | 536,314 | 201,085,000 | 325,088,000 | 61.86 | 817,796 | 952,881 | 1,311,912 | 22,552,955 | 39,736,664 | 56.25 | 9,623,860 | 9,733,191 | 98.02 | |
| Colonial | 281,151 | 70,995,000 | 138,899,000 | 51.11 | 135,488 | 107,608 | 166,993 | 7,339,675 | 14,781,068 | 49.66 | 4,993,921 | 3,979,073 | 96.81 | |
| Continental | 352,007 | 139,000,000 | 253,027,000 | 54.93 | 506,188 | 200,464 | 776,040 | 14,791,437 | 28,752,055 | 51.44 | 7,937,466 | 7,801,320 | 99.52 | |
| Delta | 975,505 | 444,149,000 | 686,600,000 | 64.69 | 1,942,163 | 1,245,149 | 4,275,185 | 50,142,668 | 82,899,778 | 60.52 | 18,172,782 | 18,047,721 | 99.00 | |
| Eastern | 3,834,702 | 1,858,965,000 | 3,184,350,000 | 58.38 | 5,738,527 | 4,001,298 | 6,845,776 | 208,291,291 | 426,037,994 | 48.89 | 62,975,980 | 61,858,852 | 98.38 | |
| Hawaiian | 363,541 | 48,383,000 | 80,269,000 | 60.28 | 30,026 | 49,897 | 1,195,244 | 5,188,580 | 9,878,969 | 52.52 | 3,803,384 | 2,865,583 | 98.79 | |
| NCA** | 266,774 | 82,226,000 | 152,772,000 | 53.82 | 264,783 | 152,879 | 331,114 | 8,621,191 | 15,551,550 | 55.44 | 5,481,674 | 5,520,775 | 97.02 | |
| National | 690,481 | 458,829,000 | 726,055,000 | 63.19 | 1,368,181 | 613,303 | 5,273,309 | 53,996,970 | 91,618,395 | 58.96 | 16,336,367 | 16,167,843 | 97.81 | |
| Northeast | 428,718 | 84,198,000 | 144,975,000 | 58.08 | 144,047 | 182,696 | 257,927 | 8,270,369 | 15,081,189 | 54.84 | 4,729,487 | 4,980,928 | 91.46 | |
| Northwest | 368,053 | 586,903,000 | 897,684,000 | 65.38 | 3,105,765 | 1,772,149 | 3,641,131 | 65,269,527 | 110,542,579 | 59.04 | 16,154,316 | 16,466,590 | 96.47 | |
| Trans Pac. | 174,933 | 23,112,000 | 49,755,000 | 46.45 | 19,987 | 5,028 | 65,362 | 1,849,024 | 4,342,605 | 42.59 | 1,777,909 | 1,490,337 | 99.36 | |
| TWA | 2,401,101 | 1,884,976,000 | 2,514,735,000 | 74.96 | 11,044,879 | 6,760,849 | 15,601,386 | 213,795,834 | 320,357,702 | 66.74 | 55,136,346 | 56,810,156 | 96.07 | |
| United | 3,400,237 | 2,273,518,000 | 3,139,823,000 | 72.41 | 20,929,648 | 10,261,307 | 26,652,089 | 275,978,905 | 471,721,344 | 58.42 | 71,706,211 | 72,758,610 | 96.51 | |
| Western*** | 774,079 | 298,933,000 | 453,331,000 | 65.94 | 1,358,444 | 507,146 | 953,679 | 31,434,343 | 48,557,190 | 64.74 | 12,830,610 | 12,830,954 | 98.00 | |
| TOTALS | 23,510,446 | 12,284,224,000 | 18,333,918,000 | 67.00 | 68,358,293 | 40,430,537 | 118,574,078 | 1,421,258,529 | 2,414,383,603 | 58.87 | 420,146,717 | 422,047,437 | 97.25 | |
| * Figures do not include operations of local service segment (route 106) now operated by Braniff Airways as a result of Braniff-NCA merger effective August 16, 1952. | | | | | | | | | | | | | | |
| ** Figures for NCA are for the period from January 1 through August 15, 1952, and do not include operations of local service segment (route 106). Mergers between Braniff and NCA was effective August 16, 1952. | | | | | | | | | | | | | | |
| *** Figures include operations of former subsidiary, Inland Air Lines, Inc., which company was dissolved and operations merged with WAL on April 9, 1952. | | | | | | | | | | | | | | |
| **** Includes air parcel post. | | | | | | | | | | | | | | |
| NOTE: Figures include both scheduled and non-scheduled operations. | | | | | | | | | | | | | | |
| 2. Schedules were curtailed during May, 1952, because of nationwide gasoline shortage. | | | | | | | | | | | | | | |

* Figures do not include operations of local service segment (route 106) now operated by Braniff Airways as result of Braniff-NCA merger effective August 16, 1952.

** Figures for NCA are for the period from January 1 through August 15, 1952, and do not include operations of local service segment (route 106).

*** Figures include operations of former subsidiary, Inland Air Lines, Inc., which company was dissolved and operations merged with NAL on April 9, 1952.

**** Includes air parcel post.

NOTE: Figures include both scheduled and non-scheduled operations.

2. Schedules were curtailed during May, 1952, because of nationwide gasoline shortage.

International Airline Traffic for December, 1952

| AIRLINES | REVENUE PASSENGERS | REVENUE PASSENGER MILES | AVAILABLE SEAT MILES | PASSENGER LOAD FACTOR | U. S. MAIL TONNAGES * | FOREIGN MAIL TONNAGES | EXPRESS TONNAGES | FREIGHT TONNAGES | TOTAL TONNAGES | REV. TRAFFIC TONNAGES | % AVAILABLE TONNAGES USED | REVENUE PLANE-MILES | SCHEDULED MILES | % SCHEDULED MILES COMPLETED |
|-------------|--------------------|-------------------------|----------------------|-----------------------|-----------------------|-----------------------|------------------|------------------|----------------|-----------------------|---------------------------|---------------------|-----------------|-----------------------------|
| American | 8,920 | 6,534,000 | 10,284,000 | 63.54 | 20,429 | 5,552 | 417 | 192,561 | 921,332 | 1,423,997 | 64.70 | 226,391 | 219,751 | 100.00 |
| Braniff | 2,974 | 7,082,000 | 15,199,000 | 46.72 | 68,676 | 14,776 | ... | 78,175 | 953,991 | 2,122,171 | 44.95 | 348,065 | 369,835 | 94.11 |
| C & S | 2,594 | 3,083,000 | 6,388,000 | 48.26 | 6,961 | 1,341 | ... | 101,806 | 431,308 | 885,020 | 48.73 | 137,781 | 143,902 | 94.79 |
| Colonial | 2,644 | 2,054,000 | 3,852,000 | 53.32 | 2,890 | 750 | ... | 4,447 | 230,065 | 462,065 | 49.79 | 74,725 | 49,646 | 97.58 |
| Eastern | 8,643 | 12,559,000 | 19,970,000 | 62.89 | 56,743 | ... | ... | 31,978 | 1,389,989 | 2,819,347 | 49.30 | 324,891 | 324,422 | 99.50 |
| National | 7,658 | 1,995,000 | 4,050,000 | 49.26 | 1,674 | ... | 3,579 | 17,835 | 226,744 | 469,995 | 48.24 | 64,868 | 64,976 | 99.83 |
| Northwest | 6,066 | 9,983,000 | 16,866,000 | 59.19 | 214,831 | 63,440 | 24,733 | 699,457 | 2,072,193 | 3,027,544 | 68.44 | 514,919 | 549,569 | 90.13 |
| Panagra | 10,852 | 12,126,000 | 20,424,000 | 59.37 | 38,506 | 35,808 | ... | 230,633 | 1,655,642 | 2,785,298 | 59.44 | 514,811 | 498,659 | 96.07 |
| PAA | 70,532 | 67,762,000 | 104,986,000 | 64.54 | 425,171 | 85,187 | ... | 2,386,566 | 9,671,818 | 15,101,848 | 64.04 | 2,435,222 | 1,863,436 | 98.16 |
| Latin Amer. | 34,755 | 43,422,000 | 77,782,000 | 55.83 | 674,543 | 193,393 | ... | 1,090,272 | 6,718,005 | 10,967,856 | 61.25 | 1,423,545 | 1,554,667 | 94.27 |
| Atlantic | 8,613 | 29,413,000 | 50,731,000 | 57.98 | 612,318 | 83,100 | ... | 569,955 | 4,491,912 | 8,330,206 | 53.32 | 988,865 | 969,299 | 99.79 |
| Pacific | 4,325 | 4,828,000 | 11,574,000 | 41.71 | 67,431 | ... | ... | 444,949 | 1,024,515 | 1,648,794 | 62.14 | 267,195 | 256,083 | 99.68 |
| Alaska | 12,831 | 34,607,000 | 52,583,000 | 65.81 | 529,054 | 203,031 | ... | 633,280 | 5,066,913 | 6,950,517 | 72.90 | 1,166,007 | 1,210,180 | 92.68 |
| TWA | 3,417 | 8,460,000 | 13,391,000 | 63.18 | 122,452 | ... | ... | 46,391 | 1,063,287 | 1,896,938 | 56.05 | 257,816 | 262,774 | 97.20 |
| United | | | | | | | | | | | | | | |
| TOTALS | 184,824 | 243,908,000 | 408,040,000 | 59.77 | 2,841,679 | 686,378 | 28,729 | 6,528,305 | 35,917,714 | 58,891,596 | 60.99 | 8,745,101 | 8,337,199 | 96.18 |

* Includes air parcel post.

NOTE: 1. Figures include both scheduled and non-scheduled operations.

2. Data in above tabulations were compiled by American Airlines from monthly reports filed by the airlines with the Civil Aeronautics Board. Figures for American Airlines include the carrier's service to Mexico but not to Canada; for Braniff to South America; C & S to South America; Colonial to Bermuda; Trans Pac. to Puerto Rico; National to Havana; Northwest to Orient and Honolulu; and United to Honolulu. Operations of U.S. carriers into Canada are included in domestic reports to CAB, in accordance with CAB filing procedures.

Concession Lease Pact Studied at Airport

The San Francisco Public Utilities Commission now has under study a new formula concept in connection with the proposed lease agreement for the restaurant, bar, and cafeteria concessions in the new terminal building at San Francisco Airport. Agreement calls for bids of a percentage of the gross sale of food, with percentage to be paid the airport from the gross sale of liquor automatically 8% greater than the rate bid on the sale of food.

The minimum rental of space for the various food and beverage facilities would be \$17,322 per month for 34,252 square feet of floor area, but the concessionaire would pay the minimum or the sum on the percentage basis, whichever is the greater. Included in the lease is an escalator clause whereby percentage rates would go up from basic rate for food sales upon reaching a specified amount.

Term of the proposed agreement is for 15 years, with an option to renew for an additional 10 years, and the concessionaire would be obligated

to spend not less than \$500,000 for decorations and equipment of the various restaurant, bar, and cafeteria locations.

J. D. Ryle to ATA Post

The public relations advisory committee of the Air Transport Association has elected Joseph D. Ryle, public relations director of American Airlines, to succeed Hayes Dever as chairman. Dever, who held the chair for two terms, is secretary and public relations director of Capital Airlines.

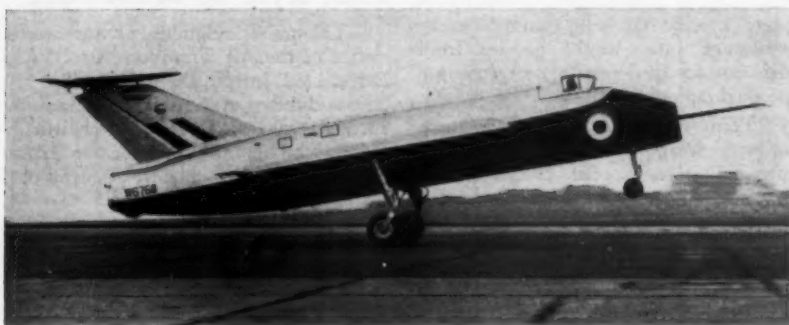
International Airline Traffic for Calendar 1952

| AIRLINES | REVENUE PASSENGERS | REVENUE PASSENGER MILES | AVAILABLE SEAT MILES | PASSENGER LOAD FACTOR | U. S. MAIL TON-MAILES* | FOREIGN MAIL TON-MAILES | EXPRESS TON-MAILES | FREIGHT TON-MAILES | TOTAL TON-MAILES | REV. TRAFFIC TON-MAILES | AVAILABLE TON-MAILES | % AVAILABLE TON-MAILES USED | REVENUE PLANE-MILES | SCHEDULED MILES | % SCHEDULED MILES COMPLETED |
|---|--------------------|-------------------------|----------------------|-----------------------|------------------------|-------------------------|--------------------|--------------------|------------------|-------------------------|----------------------|-----------------------------|---------------------|-----------------|-----------------------------|
| American | 118,213 | 89,734,000 | 141,108,000 | 63.59 | 179,070 | 53,923 | 5,730 | 1,991,735 | 11,794,424 | 19,508,746 | 60.46 | 2,827,131 | 2,830,787 | 98.51 | |
| Boeing | 34,274 | 80,323,000 | 181,892,000 | 44.16 | 457,573 | 73,787 | ..... | 1,122,440 | 10,630,618 | 25,791,188 | 41.22 | 4,220,732 | 4,332,826 | 97.41 | |
| C & S | 30,923 | 38,239,000 | 76,897,000 | 49.73 | 60,270 | 9,386 | ..... | 1,120,502 | 5,170,798 | 10,655,954 | 48.52 | 1,655,686 | 1,683,822 | 98.25 | |
| Colonial | 37,376 | 29,222,000 | 43,291,000 | 67.50 | 16,523 | 5,146 | ..... | 65,923 | 3,198,832 | 5,190,287 | 61.63 | 842,629 | 692,093 | 99.71 | |
| Eastern | 110,073 | 161,662,000 | 240,950,000 | 67.09 | 478,116 | ..... | ..... | 491,174 | 17,378,591 | 40,047,511 | 43.39 | 4,118,970 | 3,567,809 | 98.23 | |
| National | 95,200 | 24,991,000 | 44,599,000 | 56.03 | 15,582 | ..... | 42,103 | 204,304 | 2,802,178 | 5,686,158 | 49.28 | 777,828 | 795,352 | 95.68 | |
| Northwest | 80,267 | 134,853,000 | 233,556,000 | 57.74 | 1,466,930 | 447,298 | 233,333 | 7,660,237 | 24,209,224 | 36,942,352 | 65.53 | 6,235,814 | 6,288,396 | 94.04 | |
| Panagra | 120,903 | 133,288,000 | 228,671,000 | 58.29 | 401,058 | 314,334 | ..... | 2,372,480 | 17,910,923 | 31,527,251 | 56.81 | 3,965,502 | 3,879,985 | 99.54 | |
| PA | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  |
| Latin Amer. | 827,693 | 766,620,000 | 1,248,022,000 | 61.43 | 3,212,378 | 753,841 | ..... | 25,251,216 | 104,252,999 | 166,591,431 | 62.58 | 28,374,759 | 22,442,466 | 98.27 | |
| Atlantic | 432,927 | 620,115,000 | 973,813,000 | 63.68 | 5,853,824 | 1,491,211 | ..... | 13,623,270 | 88,302,166 | 133,677,465 | 66.06 | 17,723,762 | 17,809,358 | 96.33 | |
| Pacific | 100,020 | 347,751,000 | 520,932,000 | 66.76 | 4,336,502 | 790,512 | ..... | 7,015,283 | 50,274,083 | 85,603,451 | 58.73 | 10,532,762 | 10,403,797 | 99.73 | |
| Alaska | 65,769 | 72,583,000 | 151,425,000 | 47.93 | 498,676 | ..... | ..... | 5,727,310 | 13,843,545 | 23,597,331 | 58.67 | 3,553,444 | 3,174,163 | 98.88 | |
| TWA | 172,144 | 439,342,000 | 640,013,000 | 68.65 | 4,243,957 | 1,705,546 | ..... | 7,343,973 | 60,624,987 | 85,154,219 | 71.19 | 14,421,058 | 14,437,110 | 97.02 | |
| United | 52,238 | 129,375,000 | 164,054,000 | 78.86 | 837,759 | ..... | ..... | 683,214 | 15,187,527 | 22,611,323 | 67.17 | 3,114,259 | 3,098,747 | 96.73 | |
| TOTALS | 2,276,000 | 3,068,098,000 | 4,889,223,000 | 62.75 | 22,056,218 | 5,644,984 | 281,166 | 74,673,061 | 425,580,885 | 692,584,667 | 61.45 | 104,364,336 | 97,436,671 | 97.61 | |
| * Includes air parcel post. | | | | | | | | | | | | | | | |
| NOTE: 1. Figures include both scheduled and non-scheduled operations. | | | | | | | | | | | | | | | |
| 2. Schedules were curtailed during May, 1952, because of nationwide gasoline shortage. | | | | | | | | | | | | | | | |
| 3. Data in above tabulations were compiled by American Aviation Publications from reports filed by the airlines with the Civil Aeronautics Board. Figures for American Airlines include that carrier's service to Mexico but not to Canada; for Braniff to South America; C & S to South America; Colonial to Bermuda; Eastern to Puerto Rico; National to Hawaii; Northwest to Orient and Honolulu, and United to Honolulu. Operations of U.S. carriers into Canada are included in domestic reports to CAB, in accordance with CAB filing procedures. | | | | | | | | | | | | | | | |

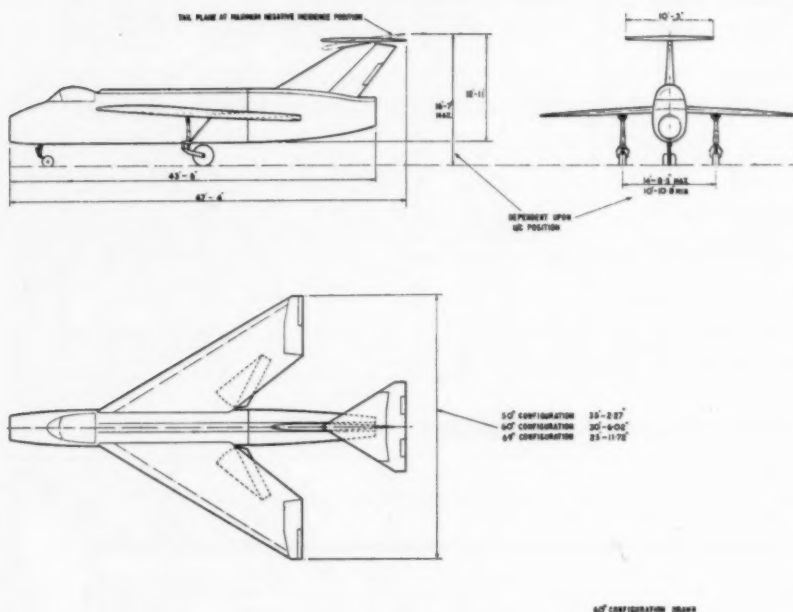
Local Service Traffic for Calendar 1952

| AIRLINES | REVENUE PASSENGERS | REVENUE PASSENGER MILES | AVAILABLE SEAT MILES | PASSENGER LOAD FACTOR | MAIL TON-MAILES | EXPRESS TON-MAILES | FREIGHT TON-MAILES | TOTAL TON-MAILES | REV. TRAFFIC TON-MAILES | AVAILABLE TON-MAILES | % AVAILABLE TON-MAILES USED | REVENUE PLANE-MILES | SCHEDULED MILES | % SCHEDULED MILES COMPLETED |
|--|--------------------|-------------------------|----------------------|-----------------------|-----------------|--------------------|--------------------|------------------|-------------------------|----------------------|-----------------------------|---------------------|-----------------|-----------------------------|
| Allegheny (1) | 183,986 | 26,796,000 | 67,696,000 | 39.59 | 63,071 | 118,638 | ..... | 2,782,460 | 7,736,695 | 35.96 | 3,223,623 | 3,344,175 | 92.26 | |
| Boeing | 43,705 | 10,751,000 | 27,797,000 | 38.68 | 16,563 | 11,514 | 26,180 | 1,081,017 | 3,133,227 | 34.50 | 1,227,264 | 1,244,111 | 97.81 | |
| Braniff (2) | 21,737 | 3,849,000 | 8,256,000 | 46.62 | 7,889 | 10,706 | 17,992 | 403,541 | 839,818 | 48.05 | 349,924 | 371,279 | 94.23 | |
| Central | 47,167 | 6,689,000 | 35,811,000 | 18.68 | 33,001 | 11,497 | 22,690 | 706,215 | 4,091,505 | 17.26 | 1,705,856 | 1,729,401 | 97.73 | |
| Empire (3) | 28,617 | 5,622,000 | 15,361,000 | 36.60 | 14,929 | 9,824 | ..... | 553,171 | 1,671,700 | 33.09 | 731,439 | 727,182 | 98.77 | |
| Frontier | 127,398 | 34,025,000 | 97,266,000 | 34.98 | 109,740 | 72,666 | 420,358 | 3,958,896 | 8,792,643 | 45.03 | 4,649,008 | 4,643,920 | 98.38 | |
| Midwest Central | 33,213 | 5,481,000 | 22,459,000 | 24.40 | 15,495 | 51,979 | 3,017 | 575,721 | 2,585,644 | 22.27 | 1,144,961 | 1,144,458 | 94.16 | |
| MCA (4) | 28,302 | 5,665,000 | 13,566,000 | 41.76 | 11,725 | 16,506 | 21,272 | 589,935 | 1,382,048 | 42.68 | 575,853 | 604,705 | 93.85 | |
| Midwest-West (5) | 866 | 128,000 | 1,055,000 | 12.13 | 3,406 | ..... | ..... | 13,975 | 116,098 | 12.04 | 263,864 | 334,832 | 78.80 | |
| Northwest (6) | 110,514 | 19,220,000 | 44,716,000 | 42.98 | 34,005 | 57,472 | 42,310 | 1,875,060 | 4,549,242 | 41.22 | 1,988,489 | 1,958,807 | 94.73 | |
| Northwest Central (7) | 153,077 | 25,238,000 | 60,240,000 | 41.90 | 94,696 | 138,341 | ..... | 2,625,174 | 6,387,868 | 41.12 | 2,867,527 | 3,123,098 | 92.53 | |
| Northwest West | 84,463 | 14,147,000 | 67,033,000 | 21.10 | 40,578 | 70,331 | ..... | 1,434,151 | 6,236,275 | 23.00 | 2,681,276 | 2,802,040 | 94.38 | |
| Southwest | 244,702 | 50,435,000 | 105,565,000 | 47.78 | 85,823 | 95,688 | 147,652 | 5,157,648 | 12,064,570 | 42.75 | 5,026,904 | 5,068,695 | 98.55 | |
| Southwest | 183,271 | 48,886,000 | 116,355,000 | 42.01 | 125,893 | 44,197 | 177,045 | 5,128,361 | 11,435,589 | 44.85 | 3,850,570 | 3,928,920 | 97.66 | |
| Southwest | 121,375 | 20,820,000 | 70,134,000 | 29.69 | 86,387 | 88,403 | ..... | 2,169,819 | 6,983,501 | 31.07 | 3,239,729 | 3,382,349 | 96.47 | |
| Southwest | 165,057 | 31,331,000 | 57,013,000 | 54.95 | 84,432 | 44,406 | 117,784 | 3,304,513 | 6,456,856 | 51.18 | 2,763,911 | 2,763,911 | 96.67 | |
| Southwest-Texas | 78,214 | 18,361,000 | 58,444,000 | 31.42 | 63,684 | 30,707 | 81,686 | 1,970,247 | 6,539,497 | 30.16 | 2,784,011 | 2,757,224 | 98.04 | |
| West Coast (8) | 114,937 | 18,674,000 | 43,896,000 | 42.54 | 20,254 | 19,082 | 42,597 | 1,762,932 | 4,163,157 | 42.35 | 2,099,356 | 2,186,614 | 94.59 | |
| Wiggins | 3,178 | 313,000 | 1,663,000 | 18.82 | 1,100 | 1,781 | ..... | 31,164 | 177,486 | 17.56 | 430,545 | 554,246 | 75.14 | |
| TOTALS | 1,773,779 | 346,433,000 | 914,326,000 | 37.89 | 912,671 | 893,738 | 1,120,583 | 36,124,000 | 95,339,419 | 37.89 | 41,623,702 | 42,669,957 | 95.90 | |
| Helicopter Mail Service | | | | | | | | | | | | | | |
| MCA | ..... | ..... | ..... | ..... | 28,966 | ..... | ..... | 28,966 | 70,300 | 41.20 | 352,797 | 364,098 | 96.89 | |
| Los Angeles | ..... | ..... | ..... | ..... | 43,257 | ..... | ..... | 43,257 | 101,342 | 42.68 | 255,936 | 284,887 | 89.73 | |
| San Francisco Airways (9) | ..... | ..... | ..... | ..... | 2,754 | ..... | ..... | 2,754 | 9,096 | 30.27 | 22,762 | 27,544 | 82.56 | |
| 1. Formerly All American Airways. Change in name was effective February 10, 1953. 2. Figures cover operations of local service route 106 operated since August 16, 1952, by Braniff Airways as result of Braniff-MCA merger. 3. Figures are through July, 1952, only. Merger between West Coast Airlines and Empire Air Lines was effective August 4, 1952. 4. Figures are through August 15, 1952, only and cover operations of local service route 106 (see footnote No. 2 above). 5. Midwest Airlines terminated its local service operations May 15, 1952, due to non-renewal of the line's certificate by CAB. 6. Formerly Robinson Airlines Corp. Change in name was effective August 23, 1952. 7. Formerly Wisconsin Central Airlines. Change in name was effective December 16, 1952. 8. Merger between West Coast Airlines and Empire Air Lines was effective August 4, 1952, West Coast being the surviving company. 9. Began operations October 15, 1952. | | | | | | | | | | | | | | |
| NOTE: Above figures include both scheduled and non-scheduled operations. | | | | | | | | | | | | | | |

International Report



SHORT SB/5 taking off. Below, a three-view drawing.



Tests Progress on "Adjustable Wing"

The Short SB/5 "adjustable wing" research aircraft which first flew last December has now completed a considerable number of flights in a program intended to investigate problems arising in the handling of swept-wing high-speed aircraft. Difficulties are encountered in maintaining control of such planes at low speeds owing to a tendency of the airflow to break away or "spill" in the region of the wing tips, thus causing loss of stability and a tendency for the controls to appear not to respond at critical speeds such as those encountered during take-off or landing.

The SB/5 was designed so that varying degrees of sweep-back could be

applied to the wings. The tailplane can also be positioned either at the extreme top of the fin or below the rear portion of the fuselage; its angle of incidence is variable in flight and can be set to any angle between 10° above and 10° below horizontal.

The varying degrees of wing sweep-back angle are achieved by fitting alternative components. Four configurations can be tested: 50° (high tail unit); 60° (low tail unit); 60° (high tail unit); 69° (high tail unit). The attitude of the non-retractable tricycle undercarriage can be changed to enable each configuration to be tested at various center-of-gravity positions. Powered by a Rolls-

Royce Derwent turbojet, the SB/5 is fitted with anti-spin and braking parachutes. Full-span leading-edge flaps are fitted.

Japanese Cabinet Approves Flag Line

Legislation leading to the establishment of a single government-controlled airline has been approved by the Japanese cabinet and will be submitted to parliament shortly. Target month for the establishment of the new airline corporation is April, with operations starting by June. In addition to being the Japanese carrier in the international field, the proposed new company will also operate the domestic routes currently flown by Japan Air Lines.

The company will be 51% owned by the government. The other 49% of the projected \$5,500,000 initial capitalization will be shared by three private companies: Japan Air Lines, Japan International World Airways, and Iino Kaiun Kaisha, a shipping company which wants to enter the air transport field. All three concerns have requested licenses for international operations.

JAL's Role

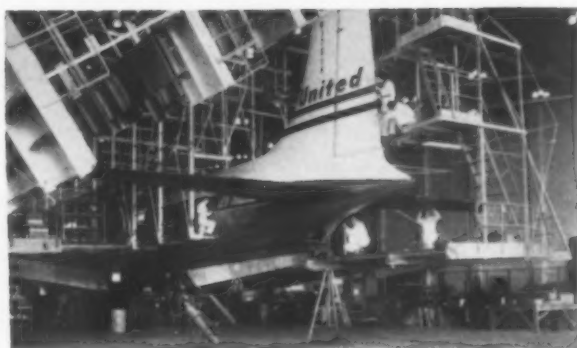
Although the government will have control, Tokyo reports indicate that the present management of JAL will play an important role in the new company. JAL is the only one of the three private companies actually operating at the present time. Moreover, it is the only one which has ordered modern pressurized equipment—four Douglas DC-6B's. JIWA has, however, arranged to buy Lockheed L-1049 Super Constellations if it is licensed by the government and, through its connection with California Eastern Airways, would be in a position to start trans-Pacific operations almost immediately.

The cabinet decision to establish a single Japanese carrier may cause JAL's procurement program to be revised. At present the company has on order four DC-6B's, one DC-6A (to be converted to DC-6B configuration), two de Havilland Comet II's, and three de Havilland Heron feeder transports. All these aircraft will be new except the DC-6A, which is being purchased from Slick Airways.

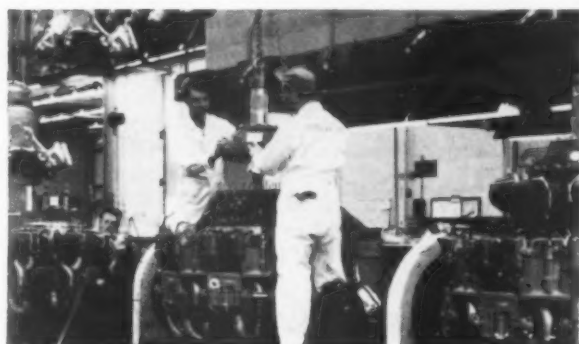
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AMERICAN AVIATION

Comet II's May Fly the Atlantic

The possibility that trans-Atlantic jet transport operation will be inaugurated with de Havilland Comet II's has been voiced by BOAC's chairman Sir Miles Thomas. The corporation is considering a "token" service with Comet II's, the first of which will be delivered in a few months, instead of waiting until 1956 for the Comet III.

The Comet II has not previously been considered capable of trans-Atlantic service due to range limitations, but Sir Miles has pointed out that there is a dearth of meteorological information at the altitude levels at which the aircraft will operate (40-45,000 feet). He feels that the acquisition of more knowledge about the behavior pattern of upper-air wind currents might give the Comet II more range than it is now credited with. One of the first assignments of the aircraft will be to start a meteorological research program to make a thorough investigation of the question.

Sir Miles predicted that civil transports would remain in the subsonic speed category for at least another fifteen years, since the purchase price and operating costs of supersonic transports would preclude their use. He said that development of a nuclear power source might permit the operation of a supersonic transport, but ventured no guess as to when it might be available. Discussing criticism of the economic potential of the Comet I, Sir Miles said that the plane is actually making a profit in current operations.

DC-3 Replacement Under Way at Percival

A "Douglas DC-3 replacement" accommodating about 20 passengers is being developed by Percival Aircraft Ltd. in England. Essentially a stretched-fuselage version of the Prince high-wing feeder transport (which is now out of production), the new aircraft will also have a greater wing span and will be powered by two Alvis Maonides engines. Percival is also working on an order for 12 Pembroke (military version of the Prince) for the Belgian Air Force.

Production of the Percival Provost trainer for the Royal Air Force is now well advanced and the first five aircraft will be delivered this month. The company is working on a jet-powered version of this trainer using an Armstrong-Siddeley Viper. This is one of Britain's lesser known turbojets. It develops between 1,000 and 1,500 pounds of static thrust.



SO 1220 helicopter by SNCA du Sud Ouest is driven by compressed air fed to the rotor blade tips by a Turbomeca Palouste generator. As there is no combustion at the tips, the model is considerably quieter than ramjet rotorcraft.

Reverse Thrust Seen for Vickers VC-7

The economy of the Rolls-Royce Conway by-pass engine will enable the Vickers VC-7 jet transport to carry 150 passengers and at such a capacity the aircraft will be more economical than the Douglas DC-6 over ranges of 300-400 miles, according to designer George Edwards. He considers the Conway to be the biggest development in jet engines since the war.

Edwards is very much aware of the necessity of not relying completely on

brakes for stopping jet aircraft, and it is certain that the VC-7 will have reverse thrust to assist deceleration. The aircraft will have very sensitive elevator control and low stalling speed. The VC-7 will have four separate doors for loading and unloading passengers. Moreover, it will have a number of large emergency exits in addition to the usual window exits (this fits in with current Air Registration Board thinking that future aircraft should have more than just window exits).

Rugged Max Holste 1521 Broussard is a light transport intended for bush operations. It is now undergoing its flight test program.



The Grumman-built Navy F9F-6, one of the newest jet fighters in production.



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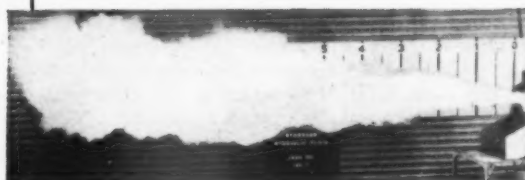
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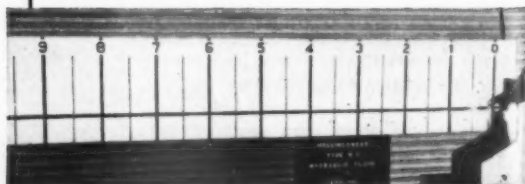
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Drive Yourself. I got such a kick out of driving in France last May that when I went back to Europe again in September to attend the annual assembly of the International Air Transport Association in Geneva, Switzerland, I decided to drive there from Paris.

So I rented another French Ford, called the Vedette, from Europcars in Paris and drove to Geneva by way of Luxembourg. I can only say again that if you want a good average usable car with the least red tape, go to Europcars, which has its headquarters in Paris, and you can drive anywhere in Europe with reasonable economy and a minimum of trouble.

I couldn't find anybody to go with me, so I hied myself out on an east-bound road and headed for Rheims where I stopped and saw the cathedral, and drove on to Luxembourg to spend the night. Next day I drove on south through industrial centers and into Switzerland and spent the night in Lucerne. On the third day I drove to Geneva via the mountains and had a fine trip.



Pick Your Route. But I find that driving by myself in Europe isn't so exciting because I always hesitate to slow down or to stop and see things along the way. Furthermore, I might as well warn you that if you stick to the main highways, and especially through industrial areas, you won't find driving to be such a thrill. Don't take the shortest route between two points, and keep away from industrial centers, otherwise you might as well be on U. S. No. 1 from New York to Philadelphia.

In Switzerland, however, a car is the right sort of locomotion. Take plenty of time, because the roads are often narrow and twisting. The views in the mountains and along the lakes are superb. And I found a car to be very useful at conventions and even in Geneva, where there's a lot of traffic, I never had any difficulty finding a parking place right near my hotel,

which, incidentally was the des Bergues, one of Geneva's best.

But after IATA I had the problem of getting back to Paris and I finally wound up with a couple of passengers. One was **Jean-Marie Riche**, AMERICAN AVIATION's Paris correspondent, and that estimable gentleman and scholar, **Rod MacInnes**, public relations director for Trans-Canada Air Lines. All of which leads me into my story.

Cathedrals and Organs. One of my weak spots is old cathedrals. Another weak spot is organ music. It happened that on the Saturday night after IATA there was to be a gala organ recital in the big cathedral at Chartres, 60 miles west of Paris. Before leaving for Geneva I had arranged that Riche and I would meet his wife and **Mimi Romedenne** of TWA at a certain cafe in Chartres and we'd all go to the cathedral together.

Being a lover of the finer things of life, Mr. MacInnes readily agreed to go along and I allowed as how it was high time that he absorbed a little culture after a week-long IATA session. So our party of three drove out of Geneva on Friday afternoon and spent the night in a second-rate hostel about a hundred miles west of Switzerland in a rather anonymous section of France. It began to rain and it was quite chilly.

Saturday morning we got a good early start and headed across France toward Chartres and managed to get there late in the afternoon. The rain had stopped but it was cold. Brandy served in lieu of coal to warm us up on arrival. At the appointed hour we went to the cafe and found **Mrs. Riche**, **Mimi**, and **Pierre Grocq**, who handles air cargo in Paris for Scandinavian Airlines System. We thus had both our own IATA group and an international assembly as well.

We Lose MacInnes. Chartres was jammed with visitors for the big organ recital. It seemed obvious to me that they had sold far more tickets than there were seats inside the big structure and my suspicion turned out to be correct. By the time we got to the cathedral, which was attractively floodlit outside, the place was packed. Rod MacInnes looked more unhappy by the minute and I felt a pang of guilt that I had dragged him all the way to Chartres for such an event. Never force culture on an airline man, I said to myself, the rate of absorption must be very gradual and painless.

We forced our way into the cathedral and before I knew it, Rod had got lost in the shuffle. The rest of us pushed up forward to the section where our seats were supposed to be, and thanks to **Pierre Grocq**, we finally made it. I kept thinking about poor MacInnes, lost far in the background, and I sus-

pected he would make his way to the railroad station and go to Paris.

MacInnes Isn't Lost. In the dim light the cathedral was magnificent. The organ concert was likewise magnificent. But the cathedral was cold. Somehow back in the 13th Century they didn't plan for central heating of those huge stone structures.

When the concert ended, the mass of humanity packed inside all started for cars, buses, and the railroad station at once and I never thought we'd find Rod. But there he was, near the exit, patiently waiting. I started to apologize to him but a smile of merry contentment and satisfaction stopped me. Far from looking unhappy, Rod exuded a glow of inspiration and achievement.

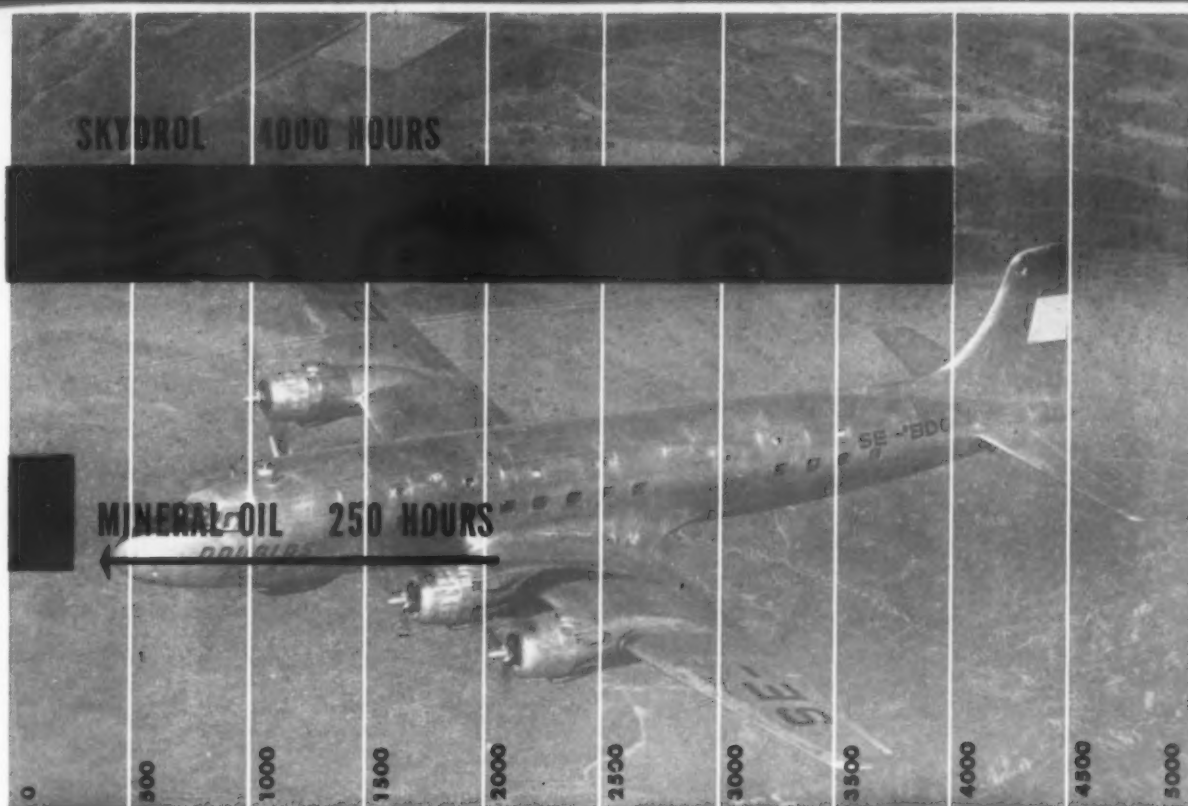
Then the story came out. Rod had gotten lost from us and was standing at the rear of the south transept when a priest came along and, taking pity on this lonesome-looking character, asked him if he was an American. Rod quickly put the priest right about that and said he was a Canadian. Oh, said the priest, and where from in Canada? Montreal, said Rod. Ah, said the priest, I'm from Montreal, too.

The MacInnes Triumph. Come with me, said the priest, and took Rod through the passageway back of the choir, from which the public was excluded, and to a secluded nook protected by a drape. Now, said the priest, we have two good seats and if you want to get a fine view of the whole proceedings, just draw back the curtain. It turned out that these two did have, indeed, the best vantage point in the cathedral.



Well, it was cold, but the priest was quite prepared. He had a bottle of wine, which he shared with our Rod, and there isn't any more to the story except that those two enjoyed the organ recital immensely while the rest of us were cold and feeling guilty about having lost Rod. Such a windfall could only happen to a guy like MacInnes who is one of the world's wonderfully human persons.

Now I hope that my Catholic friends won't be upset by my telling this story, because it fits so completely into the French scene where wine drinking is an integral part of life, and it also fits so neatly into the setting of those fine old cathedrals which have played such a part in the lives of the people through the centuries. The moral of this story, if any, is never feel sorry for Rod MacInnes.



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News at Deadline

Navy May Replace J40 With P & W J57

A switch from the Westinghouse J40 jet engine to the Pratt & Whitney J57 is under consideration by the Navy's Bureau of Aeronautics. Among the planes that would be involved in such a switch are the Grumman F10F, the Douglas A3D, and the McDonnell F3H.

Slow deliveries and high fuel consumption are cited as reasons why the J40 may be replaced. If the J57 takes its place present sources of production may have to be supplemented. Alternate sources under consideration include the Lincoln-Mercury plant at Romulus, Mich., and the Navy-owned Chrysler Detroit plant.

Kindelberger A Skeptic On Jet Transports

The jet engine that exists today was not made for transport use and is not an economic proposition, in the opinion of J. H. Kindelberger, chairman of North American Aviation. Consequently North American is not building a jet transport; if other American companies do so they will lose money, Kindelberger believes.

The propeller-driven Douglas DC-7 and the Lockheed Super Constellation will handle the lion's share of passenger traffic for several years to come, he predicted.

Kindelberger had earlier told a company gathering of executive, supervisory, and professional personnel that he expected another stretch-out in defense programs, but that other plans would be reduced before scheduled plane procurement was hit.

ODM To Set Up Group To Study Stabilization

The Office of Defense Mobilization is planning to set up an advisory committee which will make recommendations on stabilizing the aircraft industry during peacetime. Harold R. (Bill) Boyer, first chairman of the Aircraft Production Board and now a General Motors vice president in charge of the Cadillac tank plant in Cleveland has been offered the chairmanship of the new committee.

Boyer has reportedly received approval from GM to take the job, but is said to be reluctant to serve as chairman.

Martin Cleared in Suit

The Glenn L. Martin Co. has been absolved of charges that faulty construction brought about the crash of a Martin 2-0-2 that killed 36 on August 29, 1948. The decision came from a Federal grand jury in Cleveland as a result of a million-dollar damage suit brought by Northwest Airlines, which is planning an appeal.

Inwood in Phila. Post

Louis R. Inwood, director of aviation at Kansas City, has accepted the dual posts of deputy director of commerce and director of aviation for Philadelphia, as of April 1. The former chief of the city's bureau of aviation, Victor Dallin, will remain as transitional consultant indefinitely.

Runway Marks Show Comet Dragged Tail

Marks on the runway at Karachi, Pakistan, apparently indicate that the Canadian Pacific Airlines Comet IA dragged its tail before a crash ended its abortive take-off on March 3. Black skid marks also indicate heavy braking; it is assumed that the aircraft never became airborne.

Although the loss of the Comet will delay CPA's trans-Pacific service, new Convair 240 and Douglas DC-6B services have been inaugurated and are due for expansion. Latest information is that the DC-6B's will be used in service to Australia.

Twin-Engine Aeronca

A prototype twin-engine Aeronca is under construction, designed to hit the executive aircraft market. The design will carry eight passengers and a two-man crew at a cruising speed of 306 mph, up to a 20,000-foot ceiling. Power will be two Wright R1820 aircooled radials, each with 1,525 hp.

The prototype is expected to fly in 1954.

Overhaul Firms Form National Group

The major aircraft maintenance and overhaul companies have formed an organization called The Aircraft Service Association (TASA) "to assist the

armed forces in attaining efficiency, economy and safety in the current drive for greater national defense."

Head is Thomas Wolfe, president of Pacific Airmotive Corp. vice president, Robert McCulloch, president of Temco Aircraft; secretary and treasurer is Maxwell W. Balfour, vice president and director of Spartan Aircraft.

Gen. Kuter to New Post

New commandant of the Air University at Maxwell AFB, Ala., will be Lt. Gen. Laurence S. Kuter, USAF Deputy Chief of Staff-Personnel. He will be succeeded by Maj. Gen. Emmett (Rosy) O'Donnell, Jr., now commanding general of the 15th Air Force at March AFB, Calif. O'Donnell's successor will be Maj. Gen. Walter C. Sweeney, Jr., now director of plans for the 15th AF.

Spare Parts Order For Italian Firm

A contract for \$9 million worth of spare parts for the Allison J35 jet engine has been awarded to the Fiat company of Turin, Italy. The order was placed by the USAF and the parts will go to NATO nations, being distributed from the USAF's depot at Chateauroux, France.

Deliveries are scheduled to begin in July and to continue until next September. Engineers from General Motors' Allison Division will assist in the program.

T-34A Ordered By USAF

A quantity production order has been placed by the Air Force for the Beech T-34A primary trainer, which will replace the North American T-6. The T-34A will be built both at Beech's Wichita plant and at the Canadian Car and Foundry plant, Fort William, Ontario.

The trainer, a development of Beech's Model 45 Mentor, will be powered by a 225-hp Continental engine. Top speed will be 180 mph., service ceiling 20,000 feet, range 785 miles, and gross take-off weight 2,900 pounds.

Horne Leaves Post, Plans Vacation

Former Civil Aeronautics Administrator Charles F. Horne, whose resigna-

tion became effective March 6, has denied that the Aircoach Transport Association had approached him with any offer to take over its presidency, vacant since the resignation of Amos Heacock. Horne commented "It's news to me," and announced that he was headed for a vacation on the west coast.

Northrop Missile Order

An order for a guided missile has been placed with Northrop Aircraft by the USAF, board chairman Gen. Oliver P. Echols has announced. Deliveries are scheduled through 1955. Northrop has about 3,300 workers on missile projects.

Douglas Confirmed as USAF Undersecretary

James H. Douglas, Jr., has been confirmed as Undersecretary of the Air Force, replacing Roswell L. Gilpatric. Douglas, 53, is a Chicago attorney, a director of American Airlines, and a veteran of both World Wars.

Congress Set to Investigate P. O.

Both the Senate and the House have approved investigations into the operations of the Post Office Department. The Senate Rules Committee has approved S. Res. 49, which will use a budget of \$100,000 for an investigation of postal rates and policies. The House has authorized its Post Office and Civil Service Committee to investigate all matters under its jurisdiction.

Under investigation will be such problems as the relation of postal rates and charges to the reasonable cost of handling various classes of mail and the extent to which various items (such as subsidies) should be exercised when considering costs.

Production Set For CF-100 Mark 4

Production of the Mark 4 CF-100 by A. V. Roe (Canada) Ltd. will begin this summer after an order for 70 of the Mark 3's is completed. The Mark 4 is an improved version carrying 60 rockets in wing-tip pods and eight .50 caliber machine guns in a ventral pack. An empty pack may be removed and replaced with a fully loaded one in a matter of minutes.

Rapid Write-off Deadline Extended

Rapid write-offs of new transports have become available for aircraft or spare parts delivered before June 30, 1955, as the Office of Defense Mobilization extended its time limit six months beyond the previous deadline.

Goal for the program is still 600 planes; certificates of necessity have so far been issued for 359 planes.

'Copter Cost Cut

Hiller Helicopters has announced commercial production of the model 12-B, a three-place, dual controlled helicopter, at \$36,000, a drop in price of \$10,000 from the previous figure. The 12-B, similar to the Army's H-23B, will be powered by a 200-hp air-cooled engine, and will be fitted with a fully enclosed cockpit and skid-type landing gear.

Avon at 9,500 Pounds

A gross thrust rating of 9,500 pounds has been obtained with a Rolls-Royce Avon RA.7R turbojet with reheat on a 150-hour test.

Patterson Foresees Idlewild Leading

New York International Airport will without doubt become the major airport in the New York area, according to W. A. Patterson, president of United Air Lines. Patterson sees Newark as the second airport, provided that "the community becomes friendly to us rather than antagonistic." The move from LaGuardia to the other two airports should be made by all the carriers at the same time, according to Patterson's comments as reported in the UAL News.

'Stratoport' Tests Termed Encouraging

Results of tests on a wind-breaking airport "fence" have been "beyond expectations," according to Assen Jordanoff, who formed the Stratoport Corp. last August to develop the idea.

Wind tunnel tests have been conducted at Catholic University Aeronautical Laboratory, showing a 70% to 80% reduction in wind velocity when the mesh aluminum fence is used beside the runway. Reports on the tests are to go to the Port of New York Authority and the National Air Transport Co-

ordinating Committee. A proposal for a full-scale experimental program will also be made to the U. S. Air Force director of requirements.

U. S. Firms Bargain on Japanese Licenses

Three U. S. aircraft manufacturers are negotiating with Japanese interests for trainers to be built in Japan under license.

• North American Aviation, Inc. is talking with Tozai Trading Co. and Shin Mitsubishi Heavy Industry Corp. The deal would involve the latter concern building T-28A's.

• Beech Aircraft Corp is in contact with C. Itoh (Trading) Co. and Fuji Industries regarding production of T-34's by Fuji.

• Temco Aircraft Corp. is in negotiation with Okamura Seisakusho Co. for the Japanese manufacture of T-35's.

Reason for these negotiations is stated to be the Japanese government's policy of seeking Japanese-built aircraft for the nation's embryo air force and naval air arm. Two U. S. manufacturers—Bell Aircraft Corp. and Fletcher Aviation Corp.—have already arranged for the license production of their models in Japan.

New USAF Quality Control System

A new system of quality control has been instituted by the Air Materiel Command with a reduction of the AMC inspection force from 14,000 to 4,000 as one result. The new plan holds companies responsible for meeting USAF standards; the Air Force now checks only the contractor's inspection methods.

Grace Official Named Director of PANAGRA

James H. Stebbins, a vice president of W. R. Grace & Co., has been elected a director of Pan American Grace Airways. He is also a director of the National Foreign Trade Council and a past president of the American Society of Peru.

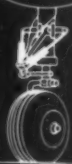
Sikorsky Firm Celebrates 30th Anniversary

Sikorsky celebrated its 30th anniversary on March 5. The United Aircraft Corp. division was established by Igor I. Sikorsky as the Sikorsky Aero Engine Corp. on Long Island on March 5, 1923.

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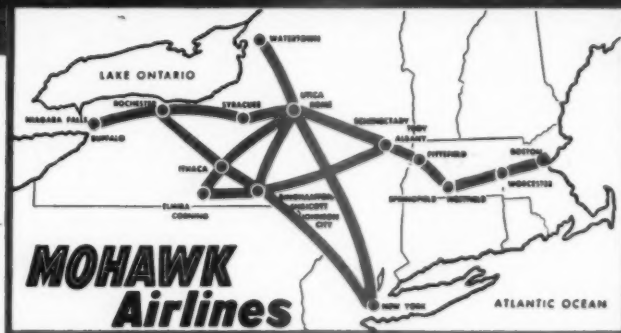
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